Government
Publications

SESSIONAL PAPERS.

VOL. XX.—PART IV.

SECOND SESSION OF SIXTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

SESSION 1888.

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1888.

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Accounts, Public	15	"
Agricultural and Arts, Report	10	"
Agricultural College, Report	16	"
Agricultural Societies, Analysis	60	*Not printed.*
Asylums, Report	13	*Printed.*
Bertie, Lots in	63	*Not printed.*
Births, Marriages and Deaths, Report	3	*Printed.*
Blind Institute, Report	6	"
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Disputed Territory, correspondence	73	*Printed.*
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No. 1.. Report of Stipendiary Magistrate Borron. (*Printed.*)

No. 2.. Detailed Report of the Inspector of Insurance. (*Printed.*)

No. 3.. Report relating to the registration of Births, Marriages and Deaths in the Province of Ontario, for the year 1886. (*Printed.*)

No. 4.. Report of the Ontario Agricultural and Experimental Union. (*Printed.*)

No. 5.. Forestry Report. (*Printed.*)

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No. 18.. Report of the Commissioner of Public Works, for the year 1887. (*Printed.*)

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No. 20.. Report of the Commissioner of Crown Lands, for the year 1887. (*Printed.*)

No. 21.. Report of the Entomological Society, for the year 1887. (*Printed.*)

No. 22.. Copy of an Order in Council, approving of certain regulations respecting the Education Department. (*Not printed.*)

No. 23.. Copy of an Order in Council, raising the High School at the Town of Chatham to the status of a Collegiate Institute. (*Not printed.*)

No. 24.. Copy of an Order in Council, approving of schedules of particulars respecting certain Indentures of Agreement entered into by the Minister of Education with certain publishers in regard to printing, publishing and selling Text Books. (*Printed.*)

No. 25.. Regulations prescribed by the Lieutenant-Governor in Council, under the Ontario Factories Act. (*Printed.*)

No. 26.. Report of the Assistant Inspector of Public Schools, upon the condition of the French Schools in the United Counties of Prescott and Russell. (*Printed.*)

No. 27.. Regulations respecting Upper Canada College. (*Not printed.*)

No. 28.. Report of the Inspector of the Elgin House of Industry, for the year ending 31st October, 1887. (*Not printed.*)

No. 29.. Copy of an Order in Council, approved on the 2nd February, 1888, commuting the fees payable to R. O'Hara, Esquire, Local Master and Deputy Registrar at Chatham. (*Printed.*)

No. 30.. Papers relating to a certain Mortgage, belonging to the estate of the late Andrew Mercer. (*Not printed.*)

No. 31.. Papers relating to the bequest of one James Evenden, formerly of the Town of Barrie, to the Deaf, Dumb and Blind Institution of Upper Canada. (*Not printed.*)

No. 32.. Copies of Orders in Council, commuting the fees of certain Surrogate Court Judges. (*Printed.*)

No. 33.. Return of a copy of the Charter of the Ontario Grain and Seed Company with the names of the Incorporators; list of stockholders and amount of stock paid up, as shown by any records of the Department, together with copies of all documents and papers filed with the Government upon or relating to the Charter. Also, copies of all correspondence between the Government and the Company, or others, in relation to the Company. Also, statement of any moneys deposited with the Government, if any, and any other information in the possession of the Government relating to the Company. (*Not printed.*)

No. 34.. Statement of the affairs of the Toronto General Trusts Company, under 35 Vic., c. 83, s. 13, for the year 1887. (*Not printed.*)

No. 35.. Report upon the Division Courts of Ontario. (*Printed.*)

No. 36.. Return shewing, as to each vacancy which has occurred since the first day of January, 1884, in the office of Sheriff, Registrar of Deeds, or County Crown Attorney, when the vacancy occurred; how it was created; when it was filled; by whom it was filled; and shewing also, which of such vacancies still remain unfilled. (*Printed,*)

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No. 39.. Return, shewing all estimates of expenses of License Commissioners, and in connection with the enforcement of the Canada Temperance Act, approved by the Provincial Secretary of Ontario, for the years 1886-87 and 1887-88, including the salary and expenses of Police Magistrate. (*Printed.*)

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No. 43.. Return shewing the number of lunatics in the County Gaols of the Province for each month from the first day of March, 1886, to the first day of March, 1887, and shewing also the number of days each lunatic was detained in the gaol. The number of buildings now under construction for the accommodation of the insane. The number they are expected to accommodate, and when the buildings will be ready for use. (*Not printed.*)

No. 44.. Report of the Commissioners of the Queen Victoria Niagara Falls Park for the year 1887. (*Printed.*)

No. 45.. Return of copies of all Orders in Council with respect to the investment of Sinking Funds of Municipalities under the provisions of the Municipal Act. (*Printed in part.*)

No. 46.. Report of the Commissioners appointed to revise and consolidate the Public Statutes of the Province. (*Printed.*)

No. 47.. Return from the Queen's Printer as to the disposal of the Sessional Statutes for the year 1887. (*Not Printed.*)

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No. 50.. Bursar's statement of the affairs of Upper Canada College, for the year ending 30th June, 1887. (*Printed.*)

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No. 52.. Return shewing the various sums expended in the last five years for Colonization Road purposes; the counties and districts in which the money was spent; the amount expended in each county and district respectively. Also, the amount, if any, spent for similar purposes, since Confederation, in the Counties of Prescott, Russell, Glengarry, Stormont and Dundas. (*Not printed.*)

No. 53.. Return of copies of all correspondence with reference to the claim of Mr. F. B. Wilkins to be placed on the list of superannuated teachers. (*Not printed.*)

No. 54.. Return shewing the number of convictions returned to the Clerks of the Peace of the several Counties in the Province during the year 1885. The number of such convictions severally made by Police Magistrates; Reeves, acting as Justices of the Peace, *ex-officio*, and duly qualified Justices of the Peace. Also, shewing the number in each County, of qualified Justices of the Peace receiving copies of the Statutes of Ontario for the same year. (*Printed.*)

No. 55.. Return of all Commissions of Inquiry issued during the years 1886 and 1887; the subject of the Inquiry in each case; the names of the Commissioners, their salary or other remuneration, and a statement of the expenses of each such Inquiry. Such Return to show whether the Commissioners, or any of them, held any, and if so, what other office or employment in the publice service of the Province. (*Printed.*)

No. 56.. Statement of the answers referred by members of the Grand Trunk Insurance and Provident Society, to certain questions submitted to them, in connection with the operations of the Workman's Compensation for Injuries Act." (*Printed.*)

No. 57.. Report upon the Hospitals of the Province, for the year ending 30th September, 1887. (*Printed.*)

No. 58.. Statement of the Returns forwarded to the Department of the Provincial Secretary of the fees and emoluments received by the Registrars of Ontario for the year 1887, made in accordance with the provisions of R. S. O., c. 111, s. 97, and 43 Vic. cap. 3, sec. 2, with which are contrasted receipts of same nature in 1885 and 1886. (*Printed.*)

No. 59.. Report of the Master of Titles, for the year 1887. (*Printed.*)

No. 60.. Report of the Electoral, District, Township and Horticultural Societies of Ontario, organized under the Agricultural and Arts Act. (*Not printed.*)

No. 61.. Return shewing the indebtedness of any municipality to the Government, whenever the same may be in arrears for over one year, either on account of principle or interest. (*Printed.*)

No. 62.. Return shewing the sum at which the contract for constructing drainage works in the Township of Raleigh was let to John Elliott; the sum paid to the said contractor; the sums, if any, paid to each of the sub-contractors, with their names and date of payment; also, the name of the engineer or other person employed by the Ontario Government on whose recommendation or report such payments have been made, together with copies of such recommendation or report, if any. Also, a Return of all correspondence and communications, if any, between any member or officer of the Government, and any one on behalf of the said sub-contractors since the first day of January, 1879. (*Not printed.*)

No. 63.. Return shewing the name of the several applicants for grants from the Crown, of the water lots in front of lots 5, 6, 7 and 8, in the first concession of the Township of Bertie, fronting on Niagara River. The names of all the parties to whom patents therefor issued, the dates of such patents and the consideration paid in each case. (*Not printed.*)

No. 64.. Return shewing the amounts received by County or City Treasurers throughout the Province, on account of fines imposed for violations of the Scott Act. (*Not printed.*)

No. 65.. Return shewing the amounts paid up to this date for land expropriated for Niagara Falls Park purposes, to whom paid and dates of payment. Also, a detailed statement of all moneys expended by the Government (other than for the purchase of land) through the Park Commissioners or otherwise, during the year 1887, and for what services and to whom paid. Also, all moneys received by the Commissioners on account of the sale of buildings, or on any other account during the year 1887; also, shewing names of all parties appointed to any office in connection with the Park up to this date, and also, shewing the nature of their employment; their salaries, and the dates of their appointment. (*Printed.*)

No. 66.. Statement of moneys received and expended on account of the Mercer estate during the year 1887. (*Printed.*)

No. 67.. Return of copies of all correspondence between the Governments of Ontario and the Dominion in reference to an alleged claim of the Six Nation Indians to compensation for lands drowned by the construction of a dam across the Grand River at Dunnville by the Welland Canal Company in or about the year 1833. (*Printed.*)

No. 68. Statement of the Bursar of the University of Toronto, shewing cash transactions, for the year ending 30th June, 1887. (*Printed.*)

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No. 72.. Report of the Secretary and Registrar of the Province, for the year 1887. (*Printed.*)

No. 73.. Correspondence respecting the Land and Timber in the recently Disputed Territory of the Province. (*Printed.*)

No. 74.. Return of copies of the evidence taken by Æmilius Irving, Esquire, Q.C., with reference to the Ontario Grain and Seed Company, and of the Report, if any, made by him with regard to the said Company, its formation, or operations. (*Not printed.*)

No. 75.. Return of copies of all correspondence between the Minister of Education and any publisher or other person respecting the authorization of text books, or the right to publish the same, subsequent to that already brought down. (*Printed.*)

No. 76.. Report upon Mechanics' Institutes. (*Printed.*)

No. 77.. Return of the Writ of Supersedeas issued for the removal of James Goulbourne, Esquire, from the Commission of the Peace for the County of Peterborough. Also, copies of all petitions or other applications for his removal, and copies of all correspondence with reference to such petitions or applications or the said removal. Also, copies of all reports to the Executive Council or His Honour the Lieutenant-Governor, with reference to the said matters, or any of them. (*Not printed.*)

No. 78.. Copy of an Order in Council commuting the fees payable to His Honour Judge Lazier under the Surrogate Courts Act. (*Not printed.*)

No. 79.. Return of copies of all correspondence and papers in any way relating to the removal of Mr. B. B. Miller, of Wiarton, from the offices of the Clerk of the Division Court, Issuer of Marriage Licenses, and from the Commission of the Peace. (*Not printed.*)

No. 80.. Return shewing the Counties in Ontario that offer a bounty for the destruction of Wolves; the amount offered and the amount paid in each year by such Counties since 1880. (*Not printed.*)

THIRTEENTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

AND

EXPERIMENTAL FARM,

1887.

Printed by Order of the Legislative Assembly.

Toronto:
PRINTED BY WARWICK & SONS, 26 AND 28 FRONT STREET WEST.
1888.

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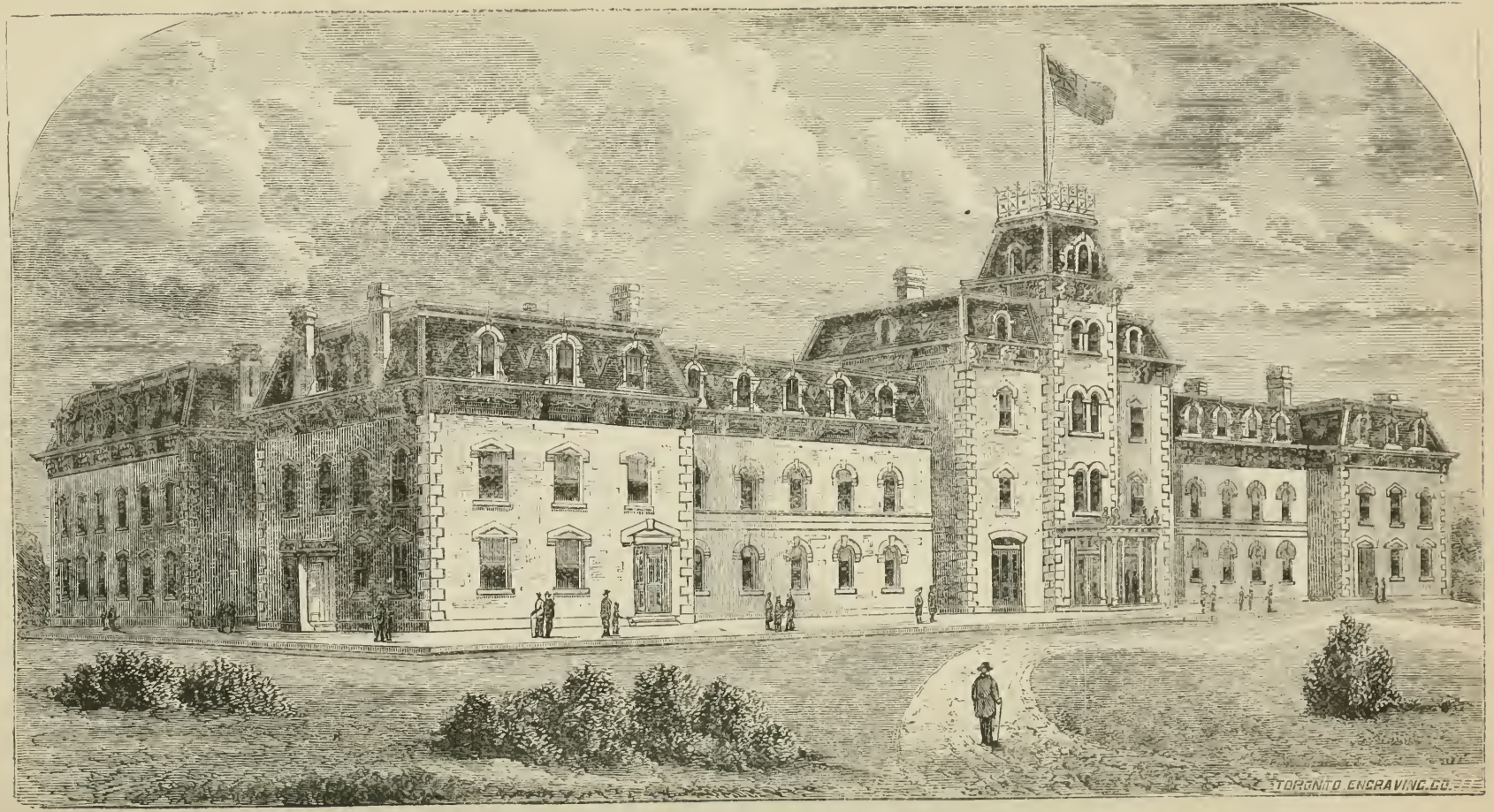


Ontario Agricultural College, Guelph, Ontario.

THIRTEENTH ANNUAL REPORT

OF THE

ONTARIO AGRICULTURAL COLLEGE

AND EXPERIMENTAL FARM.

GUELPH, January 3, 1888.

To the Honorable A. M. ROSS,
Commissioner of Agriculture:

DEAR SIR,—I have the honour to submit herewith the Thirteenth Annual Report of the Ontario Agricultural College and Experimental Farm.

In this Report we have reviewed briefly the work of the year 1887, under seven heads, as follows:—

PART I.—THE REPORT OF THE PRESIDENT.

PART II.—THE REPORT OF THE PROFESSOR OF GEOLOGY AND NATURAL HISTORY.

PART III.—THE REPORT OF THE PROFESSOR OF CHEMISTRY.

PART IV.—THE REPORT OF THE PROFESSOR OF VETERINARY SCIENCE.

PART V.—THE REPORT OF THE PROFESSOR OF AGRICULTURE.

PART VI.—THE REPORT OF THE FOREMAN OF THE HORTICULTURAL DEPARTMENT.

PART VII.—THE REPORT OF THE PHYSICIAN.

I have the honour to be, sir,
Your obedient Servant,

JAMES MILLS,
President.

PART I

REPORT OF THE PRESIDENT.

Early in this century Thomas Robert Malthus, an eminent English political economist, endeavored to show the tendency of population to increase faster than the means of subsistence; and his reasoning caused some to fear lest the earth might, in the course of time, fail to produce enough to feed the hungry millions that would be found upon it. So far, the facts appear to be against this Malthusian theory. Population has rapidly increased; but the produce of the earth is relatively more and more abundant. Taking one part of the earth with another, there seems to be more bread, meat and other kinds of food than are really needed; and hence the low price of agricultural products everywhere.

DIFFICULTIES.

In this country, the price of farm produce is exceptionally low; and we have coupled with it the comparatively high price of manufactured articles. Generally speaking, we may say that what the farmer has to sell is cheap, and what he has to buy is dear. Therefore the agricultural atmosphere is disturbed. A feeling of unrest and dissatisfaction is abroad. The farmer finds it increasingly difficult to make a comfortable living; and something must be done to remove the difficulty, or the whole community will suffer.

Farmers often get credit for grumbling without any very well defined reason; but in this case the trouble is real and serious—so much so that no one can question its existence, and wise men will not minify its gravity. What shall we do? What can we do?

REMEDIES.

So far as we see just now, there are three remedies, and only three: (1) an increased yield of farm produce, (2) better markets, (3) a reduction in the cost of living.

First, *an increased yield of farm produce.*—This can be secured only by greater skill, the application of better methods, and closer attention to business. Those who would now succeed in farming must study the principles of agriculture, and learn the best methods, and give the same close attention to business as is given by successful merchants and manufacturers. Merely scraping the soil once over and sowing crops three or four, or perhaps ten days after the proper time, will no longer serve the purpose. Such a course can lead only to disappointment and financial ruin. There are many advanced farmers in this Province who plough, harrow and cultivate their land enough to keep it thoroughly clean; who understand the principles of stock-breeding and feeding; who take good care of all their manure; who do everything thoroughly and at the best time: but it is not so with the great majority. Very different language would describe the rank and file of Ontario farmers, not to speak of the worst in the list. Now, if the many could be induced to imitate the few first-class men who are engaged in this honourable profession, we should have good reason to expect a large increase in the annual yield of farm produce, without much addition to the capital and labour now expended on our farms.

Secondly, *better markets.*—The farmer requires a small amount of the produce of his farm for his own use; but all that he has over and above this amount is no benefit to him, unless there is a demand for it. Even a very limited demand for his surplus produce makes it of some use to him; but there must be a sufficient demand at a price which will cover the cost of production and pay a fair rate of interest on the capital invested, or continuance in the business will soon lead to bankruptcy. Hence Canadian farmers have imposed upon themselves heavy taxes for the building of railroads, in order to reach or create markets for their produce; but, after all, the demand for farm produce in the Dominion is limited and the prices are exceptionally low.

Now, in view to these facts, nothing can be clearer than that the farmers have reason on their side when they demand that no restriction on trade, which this Dominion has power to remove, shall be allowed to interfere with the price of grain, fruit, live stock, or dairy products in this country.

Not having studied the pros and cons of Commercial Union, we have nothing to say on that question, but simply lay it down as fundamental, that we should seek the best trade relations which we can possibly get, whether it be by negotiation with England, the United States, or any other country.

Ontario farmers, at least, seem to understand the situation and are waking up to the necessity of united action in a matter of so much importance. Let them get a clear understanding of what their interests under this head really are: then unitedly indicate their wish, and it must be granted. If, however, they allow interested men of any class to divide their ranks and play them off one against another, they will undoubtedly fail and bring upon themselves the well-deserved contempt of every other class.

Thirdly, *a reduction in the cost of living.*—This can be secured in two ways: by the practice of greater economy, and by cheapening the means of subsistence. As regards the former, I may say that I am not one of those who think that Canadian farmers are extravagant livers. As a rule they are extremely economical. For the most part, their houses are very plain and scantily furnished; they spend but little under the head of pleasure or recreation; they wear cheap clothing; and too often they sell the best and use the worst of their own produce. I think, therefore, that there is not much room for the practice of greater economy. There is no doubt, however, that a real reduction in the cost of living would be made by reducing the price of tea, sugar, boots, shoes, clothing, iron and other articles of daily consumption in the homes of rich and poor alike; but how to accomplish this object is a difficult question. Many interests are involved, and good men hold very different views as to what is best. Some would allow foreigners to trade freely in our markets, even while they exclude us from theirs; some want a revenue tariff; and others believe in high protective duties. The diversity of opinion is bewildering, and plain men are perplexed; nevertheless it is the duty of farmers, as representing the most important industry in the country, to consider the question in all its bearings and, having done so, to insist on such tariff laws and regulations as seem most likely to benefit the country as a whole.

COLLEGES IN HARD TIMES.

A large proportion of the college students in this Province come from the farm, and any serious reduction in the income of farmers is felt more or less in all our colleges, but especially in such an institution as the Ontario Agricultural College. Hard times affect the attendance at an arts college to some extent, but not nearly so much as at an agricultural college. This may seem strange, but it is nevertheless true, and the reason is this: When a farmer sends his son to an arts college, or a medical school, he generally expects him to get an education which, without anything else, will enable him to make his way in life. Hence he will struggle hard to get what is necessary to put that son through college. But with the son that is to remain on the farm it is quite different. The father may be willing and even anxious to give him a good and thoroughly practical education; but no matter what the education may be, it will not take the place of a farm. If the boy is going to make his living by farming, he must have land in addition to his education; and the father, being unable to provide both, decides to keep the boy at home and do what he can to get him some land. Thus the attendance at an agricultural college is directly and materially affected by hard times amongst farmers.

NUMBER OF STUDENTS.

Of purely agricultural students we have, I believe, as large an attendance as any other college on this continent, except, perhaps, two; but we must candidly admit that we have not so large a number as we should have. The attendance during the past year has not been what we could have wished. Seven Associates of the College returned for the third year, and we have a much larger class of second year students than we ever had before; but the number of new students who entered in October last is exceptionally small. On the whole, we have an excellent class of students, and I think most, if not all, of them are well satisfied with the College, otherwise we should not have so many back for the second and third years. But why have we not a larger number of new students? One reason is because I have admitted scarcely any from the old country during the year. Within the last nine months I have sent between fifteen and twenty English applicants for admission away to seek work with farmers, simply because I thought it was better both for them and for the college that they should learn some of the realities of farming before coming to us. But why have we not a larger number from Ontario? Is it because of the hard times? because farmers think it does not pay to educate boys for the farm? because we are not doing our work properly? or because the farmers have mistaken notions of what our work really is? I confess my inability to give a satisfactory answer.

CHANGES AND PROGRESS DURING THE YEAR.

For eight or nine years the members of the staff and some of the ex-students have been discussing more or less the advisability of adding a year to our course of study, and at length the pressure from students and ex-students became so strong that we decided to add a third year and grant the degree of B.S.A., Bachelor of Science in Agriculture.

Our course of study for an Associate Diploma is one of two years, and embraces agriculture, live stock, dairying, arboriculture, horticulture, veterinary science, chemistry, geology, botany, entomology, English literature, political economy, book-keeping and elementary mathematics. During these two years we lay most stress on agriculture, live stock, veterinary science and chemistry. Those who complete this course get a diploma admitting them to the status of associates; and those associates who rank high in the theory and practice of the first two years and take not less than sixty per cent. of the aggregate number of marks in English grammar, literature and composition may now remain for a third year and take the following course for the degree of B.S.A., (Bachelor of Science in Agriculture):—

THIRD YEAR.

Fixed Work.

Chemistry.—A course of advanced lectures and reading on organic and agricultural chemistry, and an extended course in laboratory practice.

Natural History.—Microscopy—Physiology of plants and study of the fungi, with special reference to those which are most injurious to fruit and grain; the grasses and economic botany continued from the second year; practical work in greenhouse, garden and orchard. Further study of insects and experiments with insecticides.

Reading of works and reports to be prescribed by the Professor of Natural History.

Mechanical Drawing.—One hour per week.

English.—(1) Grammar (Whitney). (2) Composition and Rhetoric (Bain). (3) Outlines of English Literature (Lectures with Spalding and Craik). (4) Themes. (5) Critical reading of the following selections:—

Shakespeare—Richard II.
Bacon—Essays: Of Studies, Great Place, Boldness, Goodness and Goodness of Nature, Youth and Age, Discourse, Friendship.
Milton—Lycidas and Paradise Lost, Bk. I.

Pope—Essay on Criticism.
Addison—Spectator, Nos 23, 26, 47, 93, 115, 162, 225, 381, 387, 483, 583, 598.
Wordsworth—The Solitary Reaper; Intimations of Immortality; Resolution and Independence.
Macaulay—Essay on Lord Bacon.
DeQuincey—William Wordsworth.
Tennyson—Locksley Hall; In Memoriam, i.—xxvii.

Note.—In order to pass in this department it is necessary, above everything else, that the candidate know how to spell correctly and be able to write good English.

Options (5 hours per week).

1.—Agriculture and Live Stock.
2.—Dairying.
3.—Canadian Geology.
4.—Algebra or Euclid.
5.—Latin, (Principia Latina, part 1) with a view to learn the pronunciation of scientific terms and those Latin roots from which a large number of English words are derived.

The examinations on this work will all be conducted at the end of the year by outside examiners of recognized ability and experience, and none will receive degrees but those that are fairly passed and recommended by the examiners.

We have further arranged that in case an associate does not rank high enough in the work of the first two years to admit him to the third year classes, or does not care to spend the time necessary to complete the third year, but wishes to continue his studies in certain departments for a few months longer than the regular course permits, with the intention of preparing himself more fully for farm management, or for any particular work he may have in view, he may return to the college, on approval of the college staff, and spend a few months on any portion or portions of the work embraced in the curriculum.

The terms for third-year men and associates doing special work are the same as for other students, except that they pay $5.00 a term for chemicals and are exempt from tuition fees.

New Laboratory.

At last, after many years of pleading and waiting, we are able to boast of a good chemical laboratory. The building is plain, but large and commodious, consisting of an office for the chemist, a private laboratory for special analytical work, a large lecture-room, a room 21 by 53 feet for qualitative and quantitative analysis by students, a room for the assistant chemist, and one for the balances—all furnished with hardwood cases, working tables, etc., and provided with the latest and best apparatus for work in every department of chemistry. The basement also is well suited for the manufacture of super-phosphates and for experimental work in dairying. The building was erected by F. W. Swendiman, of Drayton, and is well heated by the Boulton hot water furnace. All considered, I think we may say that we have nearly everything that we need for the most extensive and thorough work in every department of chemistry. For this we are grateful.

Repairs and Alterations in College.

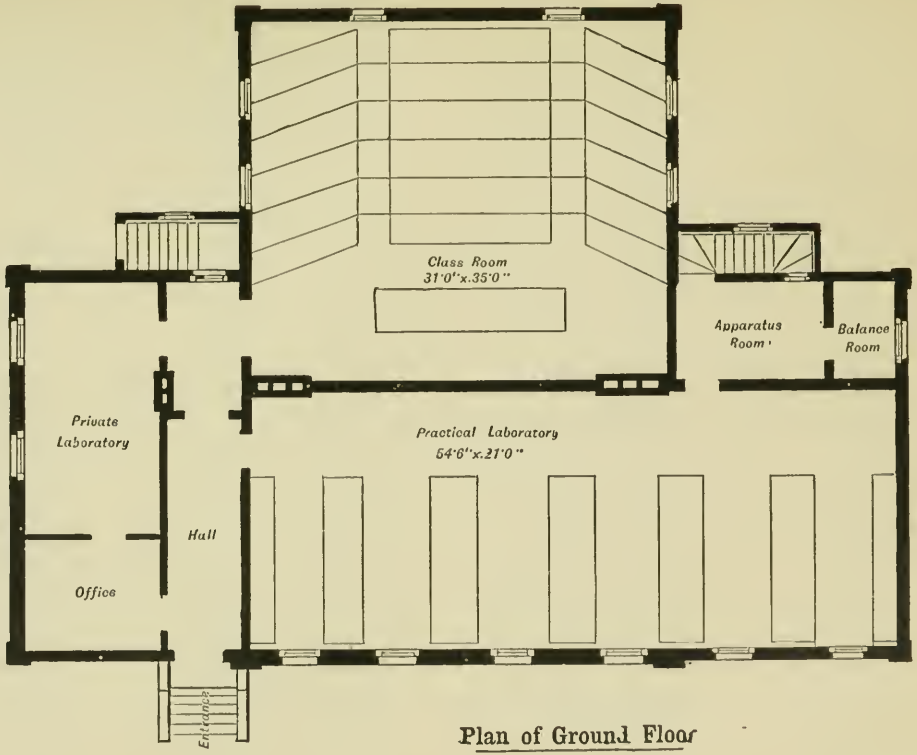
Extensive repairs and alterations have been made in the college during the past year. The outside woodwork and the greater part of the inside have been repainted; the room formerly occupied by the classes in chemistry has been converted into a beautiful reading room; the old reading-room and library have been altered so as to give us a large, new

New Laboratory, Agricultural College, Guelph.

Agricultural College, Guelph,

NEW LABORATORY.

Scale: 6 ft. = 1 inch.



Plan of Ground Floor

Department of Public Works. Ont

library and a commodious botanical laboratory. The museum also has undergone great changes. The room set apart for the purpose has been re-floored, a gallery has been constructed all round it, and five additional windows have been put in. In consequence of these alterations, the room is more cheerful, looks better, and is in every way better adapted to the purposes of a museum.

Removal of Farm Buildings.

According to the plan of the college grounds, five of the farm buildings had to be moved some distance. These are the farm foreman's stable, the large building known as the implement shed, the old engine house and annex to the implement shed, the carpenter shop, and the experimental barn. The work of moving these buildings was undertaken about two months ago and is now completed. The carpenter shop and the implement shed will continue to be used for the purposes for which they were built, the stable will be changed into a scale room, the experimental barn into a waggon house, and the old engine house into a lumber shed.

Changes in Staff.

Early in the year J. W. Robertson, Professor of Dairying, left us to engage in the produce business in Montreal; but we are glad to report that he has just returned and will henceforth devote his undivided attention to the work of the college and to the dairy interest throughout the Province.

Mr. P. J. Woods, our farm foreman, also resigned in June last to engage in farming on his own account. He has bought a good farm in the suburbs of Brampton, and hopes to do better than he could by remaining with us. Mr. Woods' successor is Mr. J. E. Story, of the County of Carleton. Mr. Story has entered upon his work with much zeal, and I have no doubt he will be successful.

Attendance.

The number on the roll in 1887 is 110; of these 78 are from Ontario and 32 from other places, as indicated in the list and analysis given below. Thirty-four of the counties of Ontario are represented, and the largest representation is from the County of Middlesex.

COLLEGE ROLL FOR 1887.

NAMES.	P. O. ADDRESSES.	COUNTIES, Etc.
Third Year Students.		
Craig, J. A.	Russell	Russell, Ont.
Creelman, G. C.	Collingwood P. O.	Grey, Ont.
Fee, J. J.	Toronto	Toronto, Ont.
Paterson, B. E.	Ottawa	Ottawa, Ont.
Raynor, T.	Rose Hall	Prince Edward, Ont.
Sharman, H. B.	Stratford	Perth, Ont.
Zavitz, C. A.	Coldstream	Middlesex, Ont.
—7		
Associates doing Special Work.		
Calvert, S.	Rochdale	England.
Lehmann, A.	Orillia	Simcoe, Ont.
Muir, J. B.	North Bruce	Bruce, Ont.
—3		

COLLEGE ROLL.—*Continued.*

NAMES.	P. O. ADDRESSES.	COUNTIES, ETC.
Second Year Students.		
Acres, A. G	Ottawa	Ottawa, Cnt.
Austin, A. M	Thornholm, Sunderland	England.
Bayne, S. R	Lee, Kent	England
Birdsall, W. G	Birdsall's	Peterborough, Ont.
Bishop, W. R	Brussels	Huron, Ont.
Budd, W	Delhi	Norfolk, Ont.
Brown, S. P	Whitby	Ontario, Ont.
Carpenter, W. S	Simcoe	Norfolk, Ont.
Dean, H. H	Harley	Brant, Ont.
De Mauritz, R. C	Belleville	Hastings, Ont.
*Donald, G. C	St. George	Brant, Ont.
*Donaldson, F. N	Tipperary	Ireland.
Elton, C. W. S	Pincher Creek	North-West Teoritory.
Elton, R. F	Pincher Creek	North-West Territory.
*Ewing, W	Mulmur	Dufferin, Ont.
*Gilbert, W. J	Shediac	New Brunswick.
*Hart, J. A	Berwick	Nova Scotia.
*Hart, J. W	Bridgetown	Nova Scotia.
*Harkness, A. D	Irene	Dundas, Ont.
Harcourt, G	St. Ann's	Lincoln, Ont.
Harrison, R. S. C	Stirton, Nottinghamshire	England.
Heacock, F. W	Kettleby	York, Ont.
Horrocks, T. J	Toronto	Toronto, Ont.
*Howes, J. S	Harriston	Wellington, Ont.
King, R. E	Decewsville	Haldimand, Ont.
Knowlton, S. M	Newboro'	Leeds, Ont.
*Leavens, D. H	Belleville	Hastings, Ont.
*Lick, E	Oshawa	Ontario, Ont.
*Livesey, E. M	London	England.
*McCallum, E. G	Martintown	Glengarry, Ont.
*Morgan, H. A	Kerwood	Middlesex, Ont.
McKenzie, A. G	Fairview	Oxford, Ont.
Morrison, W. S	Minden	Haliburton, Ont.
Nelles, S. W	York	Haldimand, Ont.
*Orsman, C. P	Bathurst	Lanark, Ont.
Palmer, W. J	Charlottetown	Prince Edward Island.
Price, V	Selby Oak, near Birmingham	England.
Ritchie, H	Toronto	Toronto, Ont.
Rayden, J. S	Charlottetown	Prince Edward Island.
Rennie, E. A	Hamilton	Wentworth, Ont.
Robson, J. W	Liverpool	England.
Rowen, M. B	Holt	York, Ont.
*Scrugham, J. G	Toronto	Toronto, Ont.
Scott, J. A	Stoke, Devenport	England.
Serson, W. E	Antrim	Carleton, Ont.
Shantz, A	Waterloo	Waterloo, Ont.
Shirreffs, G. G	Clarence	Russell. Ont.
Sinclair, J. J	Ridgetown	Kent, Ont.
*Sleightholm, F. J	Humber	Peel, Ont.
Somerville, A. R	Huntingdon	Quebec.
Soule, R. M	South End	Welland, Ont.
Steacy, M. W	Warburton	Leeds, Ont.
Thompson, T. F	Uxbridge	Ontario, Ont.
Valance, R	Osnabruck Centre	Stormont, Ont.
Willans, T. B	Leeds	England.
Willans, N	Leeds	England.
Wilmot, A. B	Oromocto	New Brunswick.

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* Took an Associate Diploma in June.

COLLEGE ROLL.—*Concluded.*

NAMES.	P. O. ADDRESSES.	COUNTIES. ETC.
First Year Students.		
Asbury, E.	Delaware	Middlesex, Ont.
Boyd, W. C.	London	Middlesex, Ont.
Brodie, G. A.	Bethesda	York, Ont.
Campbell, W.	Elphin.	Lanark, Ont.
Carlaw, G.	Warkworth	Northumberland, Ont.
Cleugh, H. H.	Sarginson	Northumberland, Ont.
Culshaw, C.	Ashton on Ribble	England.
Denison, D.	Selby	Lennox, Ont.
Drysdale, W. P.	Liverpool	England.
Esplen, J. H.	Burgoyne	Bruce, Ont.
Gardiner, R. J.	Guelph	Wellington, Ont.
Gaunt, E.	Whitechurch	Bruce, Ont,
Globensky, E. A.	A Saint Eustache	Quebec.
Graham, G. M.	Penzance, Cornwall	England.
Jackson, F. A.	Lyme Regis, Dorset	England.
Jarvis, E. M.	Toronto	Toronto, Ont.
Lea, H. F.	Toronto	Toronto, Ont.
Linfield, F. B.	Dunlop	Huron, Ont.
Lyster, G. R.	Guelph	Wellington, Ont.
McEvoy, T. A.	London	Middlesex, Ont.
McCallum, W.	Ailsa Craig	Middlesex, Ont.
Marsack, F.	Tunbridge Wells	England.
Marsack, H.	Tunbridge Wells	England.
Maynard, A. K.	Toronto	Toronto, Ont.
Monk, W. D.	South March	Carleton, Ont.
Monteith, N.	Farview	Perth, Ont.
Mott, C. J.	London	England.
Musgrave, J.	Cowichan	British Columbia.
Mutton, F. A.	Toronto	Toronto, Ont.
Pike, S.	Locust Hill	York, Ont.
Rendall, W.	Thornbury	Grey, Ont.
Routhier, J. A.	Ottawa	Ottawa, Ont.
Seabrook, P. S.	Delaware	Middlesex, Ont.
Shipley, L. J. W.	Denfield	Middlesex, Ons-
Smith, D.	Montreal	Quebec.
Stewart, A. W.	Lanark	Lanark, Ont.
Stewart, J. B.	Peterboro'	Peterborough, Ont.
Stubbs, H. C. W.	Liverpool	England.
Sullivan, R.	Dublin	Ireland.
Tuck, H. F.	Orangeville	Dufferin, Ont.
Van Luven, R. M.	Murvale	Frontenac, Ont.
Warner, F. C.	Decewsville	Haldimand, Ont.
White, S. A. K.	Ottawa	Ottawa, Ont.

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ANALYSIS OF ROLL.

Counties, etc.	No. of Students.	Counties, etc.	No. of Students.
Brant	2	Haliburton	1
British Columbia	1	Hastings	2
Bruce	3	Huron	2
Carleton	2	Ireland	2
Dufferin	2	Kent	1
Dundas	1	Lanark	3
England	18	Leeds	2
Frontenac	1	Lennox	1
Glengarry	1	Lincoln	1
Grey	2	Middlesex	8
Haldimand	3	New Brunswick	2

ANALYSIS OF ROLL.—*Concluded.*

Counties, etc.	No. of Students.	Counties, etc.	No. of Students.
Norfolk	2	Quebec	3
Northumberland	2	Russell	2
North-West Territory	2	Simcoe	1
Nova Scotia	2	Stormont	1
Ontario (County)	3	Toronto	8
Ottawa	4	Waterloo	1
Oxford	1	Welland	1
Peel	1	Wellington	3
Perth	2	Wentworth	1
Peterborough	2	York	4
Prince Edward (County)	1		
Prince Edward Island	2		110

RELIGIOUS DENOMINATIONS.

Episcopalians	44	Friends	2
Presbyterians	26	Catholics	2
Methodists	21	Brethren	1
Congregationalists	5	Menonites	1
Baptists	4		
Christians	4		110

AGE OF STUDENTS.

7	16 years of age	7	23 years of age
10	17 "	7	24 "
13	18 "	2	25 "
20	19 "	1	26 "
25	20 "	1	27 "
8	21 "	1	28 "
8	21 "		

Average age, 19 years.

COUNTY STUDENTS.

Of those in attendance during the year, thirty-one were nominated by county councils, and as a consequence were exempted from the payment of tuition fees. The counties represented were the following :—

Brant, Bruce, Carleton, Dufferin, Elgin, Frontenac, Glengarry, Grey, Haldimand, Haliburton, Huron, Kent, Lanark, Leeds, Lennox and Addington, Lincoln, Middlesex, Norfolk, Nothumberland and Durham, Ontario, Oxford, Peel, Peterborough, Russell, Stormont, Waterloo, Welland, Wellington and York.

WORK DURING THE YEAR.

Nothing specially noteworthy in the work of the college has occurred during the year. The regular routine of lectures, recitations and examinations has been gone through as usual. The syllabus of lectures given in Appendix 1 will convey some idea of the class-room work, and the class-lists in Appendix 4 indicate the standing of each student more than anything I could say.

The work in the College is divided into five departments, and those students who get an aggregate of 75% of all the marks allotted to the subjects in any department are ranked as first-class men in that department.

The examiners last year were the professors of the College and two other gentlemen, to whom we are much indebted, viz.: S. C. Smoke, B.A., of Toronto, examiner in English literature, and W. A. Douglas. B.A., of the same place, examiner in political economy.

We would like to see a larger number of first-class men; but we are determined that none shall be ranked first-class unless they really deserve it. The following list contains the names of those who gained first-class rank in the different departments at the examinations of last year.

First Class Men.

(Ranked according to standing in general proficiency.)

First Year.

1. *Harcourt, G.*, Welland, Ont.—In five departments: Agriculture, Natural Science, Veterinary Science, English Literature, Mathematics and Book-keeping.

2. *Robson, J. W.*, Liverpool, England.—In four departments: Agriculture, Natural Science, Veterinary Science, English Literature.

3. *McKenzie, A. G.*, Fairview, (Oxford), Ont.—In five departments: Agriculture, Natural Science, Veterinary Science, English Literature, Mathematics and Book-keeping.

4. *Dean, H. H.*, Harley, (Brant), Ont.—In three departments: Agriculture, Veterinary Science, English Literature.

5. *Shantz, A.*, Waterloo, Ont.—In one department: Veterinary Science.

6. *Rayden, J. S.*, Charlottetown, P. E. I.—In one department: Natural Science.

7. *Stewart, R.*, Ottawa.—In one department: Mathematics and Book-keeping.

8. *Sinclair, J. J.*, Ridgetown, (Kent), Ont.—In one department: Mathematics and Book-keeping.

Second Year.

1. *Scrugham, J. G.*, Toronto.—In five departments.

2. *Sleightholm, F. J.*, Humber, (Peel), Ont.—In five departments.

3. *Lick, E.*, Oshawa, (Ontario), Ont.—In five departments.

4. *Hart, J. W.*, Bridgetown, Nova Scotia.—In five departments.

5. *Craig, J. A.*, Russell, (Russell), Ont.—In two departments: Agriculture and Natural Science.

6. *Morgan, H. A.*, Kerwood, (Middlesex), Ont.—In one department: Agriculture.

7. *Donaldson, F. N.*, Tipperary, Ireland.—In one department: English Literature.

Medallists.

Medals were awarded to the three second year students who ranked highest in general proficiency in the theory and practice taken together. The competition was close and very keen, with the following results:—

Gold Medallist.—F. J. Sleightholm, Humber, Ont.
Lansdowne Silver Medallist.—J. G. Scrugham, B.A., Toronto.
Second Silver Medallist.—Elmer Lick, Oshawa, Ont.

Valedictory Addresses.

The Valedictory Addresses on behalf of their fellow students, were delivered by G. C. Donald, of St. George, and Mr. Sleightholm.

DIPLOMAS.

Twenty young men having completed the course of two years, received diplomas admitting them to the status of Associates of the College. The diplomas were presented by the Hon. A. M. Ross, Commissioner of Agriculture, and the names of the recipients are as follows :—

Craig, John A.	Russell, County of Russell, Ont.
Creelman, G. C	Collingwood P.O., Grey, Ont.
Donald, G. C	St. George, Brant, Ont.
Donaldson, F. N.	Mobarnane, Tipperary, Ireland.
Ewing, William	Mulmur, Dufferin, Ont.
Gilbert, W. J	Dorchester, N. B.
Hart, J. A	Berwick, N. S.
Hart, J. W.	Bridgetown, N. S.
Harkness, A. D	Irene, Dundas, Ont.
Howes, J. S.	Harriston, Wellington, Ont.
Leavens, D. H.	Belleville, Hastings, Ont.
Lick, Elmer	Oshawa, (Ontario County), Ont.
Livesey, E. M,	London, England.
McCallum, E. G.	Martintown, Glengarry, Ont.
Morgan, J. H. A	Kerwood, Middlesex, Ont.
Orsman, C. P	Bathurst, Lanark, Ont.
Paterson, B. E	Ottawa, Ont.
Scrugham, J G	Toronto, Ont.
Sleightholm, F. J	Brampton, Peel, Ont.
Sharman, H. B	Stratford, Perth, Ont.

Associates.

The total number of associates up to the present time is 137 ; and the list is as follows :—

Date. **A**

1880—Anderson J.
1880—Ash, G. E.

B.

1881—Ballantyne, W. W.
1884—Black, P. C.
1882—Blanchard, M. G.
1879—Bannard, E. L.
1886—Broome, A. H.
1886—‡Brown, C. R.
1885—‡Butler, G. C.

C.

1886—Calvert, S.
1877—Campbell, J. A.
1880—Campbell, D. P. L.
1884—*Carpenter, P. A.
1880—Chapman, R. K.
1882—Charlton, G. H.
1882—Chase, O.
1879—Clark, J.

Date. **C.**

1879—Clinton, N. J.
1880—Clutton, A. H.
1886—Cobb, C.
1887—Craig, J. A.
1887—Creelman, G. C.
1878—Crompton, E.

D.

1878—Davis, C. J.
1880—Dawes, M. A.
1882—Dawson, J. J.
1882—Dennis, J.
1881—Dickinson, C. S.
1887—Donald, G. C.
1887—Donaldson, F. N.
1877—Douglas, J. D.
1877—Dunlop, S.

E.

1882—Elworthy, R. H.
1887—Ewing, W.

* Gold Medallist. ‡ Second Silver Medallist.

Associates.—*Continued.*

Date. **F.**

1878—Farlinger, W. K.
1886—Fee, J. J.
1881—File, J.
1882—Fotheringham, J.
1883—‡Fotheringham, W
1879—Fyfe, A.

G.

1883—Garland, C. S.
1887—Gilbert, W. J.
1879—Gillespie, G. H.
1878—Graham, D.
1879—Greig, G. H.
1881—Grindley, A. W.

H.

1882—Hallesy, F.
1887—Harkness, A. D.
1887—Hart, J. A.
1887—Hart, J. W.
1886—Holtby, R. M.
1880—Holterman, R. F.
1882—Horne, W. H.
1887—Howes, J. S.
1882—Howitt, W.

I.

1886—Idington, P. S.

J.

1886—Jeffrey, J. S.
1883—Jeffs, H. B.
1879—Jopling, W.

L.

1882—Landsborough, J.
1887—Leavens, D. H.
1884—‡Lehmann, A.
1887—‡Lick, E.
1877—Lindsay, A. J.
1887—Livesey, E. M.
1880—Lomas, J. W.
1878—Logan, T.

M.

1880—Macaulay' H.
1885—Macpherson, A.
1886—*Madge, R. W.
1882—Mahoney, E. C.

Date. **M.**

1884—Major, C. H.
1877—Mason, T. H.
1887—McCallum, E. G.
1885—McIntyre, D. N.
1885—McKay, J. B.
1886—McKay, J. G.
1883—McPherson, D.
1877—Meyer, G. W.
1887—Morgan, J. H. A.
1881—Motherwell, W. R.
1885—†Muir, J. B.

N.

1878—Naismith, D. M.
1879—Nicol, A.
1882—Nicol, G.
1886—Notman, C. R.

O.

1877—O'Beirne, A. C.
1887—Orsman, C. P.
1886—Owen, W. H.

P.

1887—Paterson, B. E.
1883—Perry, D. E.
1881—§Phin, R. J.
1881—Phin, W. E.
1881—Pope, H.
1886—Power, R. M.
1884—Powys, P. C.

R.

1882—‡Ramsay, R. A.
1879—Randall, J. R.
1885—*Raynor, T.
1885—Reid, P.
1883—*Robertson, W.
1879—Robertson, J.
1881—Robins, W. P.
1879—Robinson, C. B.
1881—Ross, J. G.

S.

1884—Saxton, E. A.
1883—Schwartz, J. A.
1887—†Scrugham, J. G.
1887—Sharman, H. B.
1877—Shaw, G, H.

* Gold Medallist. † First Silver Medallist. ‡ Second Silver Medallist.
§ Winner of the Governor-General's Medal—the only Medal given that year.

Associates.—*Continued.*

Date.	S.
1882—	†Shuttleworth, A.
1882—	Silverthorne, N.
1884—	†Slater, H. (ob.)
1887—	*Sleightholm, F. J.
1885—	Smith, E. P.
1884—	Steers, O.
1878—	Stewart, W.
1882—	Stover, J. W.
1886—	†Sturge, E.
1877—	Sykes, W. J.

	T.
1885—	Thompson, W. D.
1879—	Toole, L.
1883—	Torrance, W. J.
1884—	Tucker, H. V.

Date.	W.
1879—	Warnica, A. W.
1884—	Wark, A. E.
1878—	Warren, J. B.
1880—	§Webster, J. L,
1879—	Wells, C.
1882—	*Wettlaufer, F.
1882—	White, C. D.
1879—	White, G. P.
1879—	Wilkinson, J. P.
1879—	Willis, J.
1883—	†Willis, W. B. (Ob.)
1884—	Wroughton, T. A.

	Z.
1886—	Zavitz, C. A.

SMOKERS AND NON-SMOKERS.

I am sorry to say that a number of our students have still to be gazetted as smokers; but it is true now, as it was three years ago, that our best students are nearly all non-smokers. The first year students of 1887 won 131 first-class honors. Of these 19 were taken by smokers and 112 by non-smokers. The second year students won 114—4 going to smokers and 110 to non-smokers. Of the 15 first-class men in departments, whose names are given above, 2 were smokers and 13 non-smokers; and of the 20 medallists, whose names will be found in the list of associates, 3 were smokers and 17 non-smokers.

FARMERS' INSTITUTES.

The work of arranging for and helping at Farmers' Institute meetings has greatly increased during the last two years. In 1887 we assisted in holding no less than 40 such meetings, and the demand for help at the present time is greater than ever. The farmers themselves prepare papers, and all the professors of the college go out to assist during the winter vacation, speaking in day time and travelling at night. In this way much work has been done for a very trifling expenditure. In fact it is doubtful whether any other province or state on the continent has held so many successful meetings and has done so much good work for so small an outlay.

The correspondence and other work necessary in arranging for so many meetings at different points throughout the province occupy a great deal of time, so much, in fact, that some states of the Union have men called superintendents of Farmers' Institutes, who are employed at large salaries for that work alone.

The calls for assistance from the College have become so numerous and urgent that, as a rule, we cannot send more than one professor to each institute; but we are arranging for a few of the leading farmers of the province to accompany the professors. Last year we received very valuable assistance from John McMillan, M.P., and John I. Hobson, chairman of the College Board.

* Gold Medallist. † First Silver Medalist. § Winner of the Governor-General's Medal—the only medal given that year.

Time to Apply for Help.

Just here I would like to say a word to Secretaries of Farmers' Institutes. The Commissioner of Agriculture is anxious that we should do all in our power to assist you at your institute meetings, and it is our wish to do so; but the only time we can spare for such work is from the 1st to the 23rd January each year, and our programme for that time should be made out and announced early in December. Hence, if you wish assistance from the College you should always send me a written application not later than the middle of November.

We can arrange so as to let the Professor of Dairying go at other times, say February, the first half of March, November, and December, and occasionally in July, August, September, and October.

Work on Farm.

A full account of the work on the Farm will be found in the reports of Professor Brown, Mr. Story and Mr. McIntosh, and the work in the Horticultural Department is described in Mr. Forsyth's report. So far as I know, there is nothing specially noteworthy, except a determined effort to destroy all thistles and other noxious weeds by a more thorough cultivation of our stubble ground in the fall, by gang-ploughing and harrowing immediately after the removal of the crop, cultivating once or twice, if possible, and then ploughing thoroughly later in the fall. In this way, with proper cultivation at other times, we hope before long to make the farm a model as regards its freedom from every kind of troublesome weed. We are bound to do so, or publicly acknowledge our failure.

Other Departments.

Very valuable work is now being done in the departments of Chemistry and Natural History; and, for a detailed account of the year's operations in these departments, I need only refer to the reports of Professors James and Panton.

Professor Panton, as librarian and curator of the museum, has said all that it is necessary to say regarding our reading-room, library and museum; and Professor Grenside has reported not only our work but our losses in the Live Stock department during the year: so it is not necessary that I should do more than make the financial statement and refer to one or two items, for which I think money should be voted at as early a date as possible.

FINANCIAL STATEMENT.

I.—College.

Expenditure.—No. 1—College Maintenance.

1. Salaries and Wages		$12,368 73
2. Food—		
Meat, fish and fowl	3,178 11½	
Bread and biscuits	579 66	
Groceries, butter and fruit	3,475 15½	
3. Household Expenses—		
Laundry, soap and cleaning	117 28	
Women servants' wages	1,495 90	
4. Buisness Department—		
Advertising, printing, postage and stationery	719 33	
5. Miscellaneous—		
Chemicals, apparatus, etc	85 07	
Library and reading-room (books, papers, and periodicals)	301 83	
Unenumerated	571 58	
		$22,892 65

No. 2.—Maintenance and Repairs of Government Buildings.

Furniture and furnishings	$ 596 15	
Repairs and alterations	432 53	
Fuel	3,138 14	
Light	807 80	
Water	412 50	
		$5,387 12
		$28,279 77

Revenue.

1. Tuition fees	$1,661 70	
2. Balances paid for board, after deducting allowances for work	4,043 31	
3. Chemicals used by associates	50 00	
4. Fines and breakage	32 90	
5. Sheets, blankets, etc. (sold to students after change in regulations)	16 08	
6. Supplemental examinations	2 50	
		$5,806 49
Net cash expenditure		$22,473 28

The net sum voted by the Legislature for the expenditure of the College was $25,815, consequently the unexpended balance for the year is $3,341.72.

Adjustment of College Expenditure.

Net cash expenditure, as above	$22,473 28	
Produce, etc., from farm and garden, (see Appendix 5)	1,331 85	
		$23,805 13
Amount paid by College for labour of students on farm and garden	$3,192 05	
Half-salary farm superintendent	1,000 00	
Other payments on account of farm officers	820 00	
		$5,012 05
Total net expenditure of College		$18,793 08

II.—Farm.

Expenditure.

1. Salaries (farm foreman, and foreman of mechanical department	$1,289 47
2. Wages of men	2,626 41
3. Implements, feed, hardware, repairs, etc	3,745 28
4. Permanent improvements (new engine house, shafting and pulleys, draining, moving and altering buildings, etc.)	1,551 82
	$9,212 98

Revenue.

Cash for stock, service of animals, etc	$2,440 78
Net cash expenditure of farm	$6,772 20

Adjustment of Farm Expenditure.

Net cash expenditure, as above	$6,772 20	
Less amount supplied to College, (see Appendix 5)	683 36	
Entire net expenditure (apart from student labor)		$6,088 84

III.—Experimental Department.

Expenditure.

1. Salary of assistant superintendent	$ 500 00	
2. Wages	568 58	
3. Laboratory expenses, experimental dairy, feed, seeds, manure, etc	$1,424 15	
Total cost for experiments		$2,492 73

IV.—Horticultural Department.

Expenditure.

1. Salary of foreman	$ 700 00	
2. Wages of men	2,059 63	
3. Seed, repairs, etc.	764 64	
		$3,524 27

Revenue.

Berries, grapes, etc	$ 296 69	
Net cash expenditure of Horticultural Department		$3,227 58

Adjustment of Expenditure of the Horticultural Department.

Net cash expenditure, as above	$ 3,227 58	
Amount supplied to College (see Appendix 5)	$ 648 49	
Supplied to Prof. Brown (see Report, Part VI.)	48 27	
		696 76
Total net expenditure of Horticultural Department		$2,530 82

Total net Expenditure of all Departments in 1887.

College	$22,473 18
Farm	6,772 20
Experiments	2,492 73
Horticultural Department	3,227 58
Total	$34,965 69

The net sum voted by the Legislature for all Departments was $40,011. So the unexpended balance for the year is $5,045.31.

Notes on Financial Statement.

In this financial statement I have not included the amount expended on capital account by the Public Works Department for the new Chemical Laboratory, and for alterations in library, museum, reading-room and barns.

In judging of the College expenditure, it is necessary to bear in mind that $3,192.05 of it is for student labour, a great portion of which is worth very little to the Institution, and would not be paid for on an ordinary farm.

In the farm expenditure, you will notice $1,289.47 salaries paid to two foremen. These foremen devote most of their time to instruction of students, and would not be required on any but a college farm.

Other items might be mentioned, but these two are sufficient to show that there are things connected with a teaching and experimental institution which necessitate a larger expenditure than would be required to do the same work on any ordinary farm.

Conclusion.

In order to equip us completely for years to come, we still need the following buildings:

1. A building to be used as a gymnasium and convocation hall.
2. New green and propagating houses.
3. Two cottages for Professors of Chemistry and Natural History.
4. A building near the College to be used as stable and carriage house.
5. A small experimental barn in the experimental field.
6. A piggery.

As we spent a considerable sum on new buildings and alterations last year, I ask only the carriage house, the experimental barn, and the piggery this year. These, taken together, will not amount to much. Our own carpenter, with the help of students, can build the piggery and the experimental barn and the carriage house should not cost more than $1,000.

Hoping that these items may receive your favourable consideration,

I am,

Your obedient servant,

JAMES MILLS,
President.

APPENDIX 1.

SYLLABUS OF LECTURES.

Lectures began, as usual, on the 1st October, 1886, and continued till the 30th June, 1887, which latter date was the end of the scholastic year, 1886-7.

The following syllabus of lectures will convey some idea of the field covered by the several Professors in the nine months just mentioned :—

FIRST YEAR.

Fall Term—1st October to 22nd December.

Department 1.—Agriculture.

Introductory.—Ancient and modern agriculture; agricultural literature; different kinds of farming.

Soils.—Natural conditions of soil and plant; examination and classification of soils; physical properties of each kind.

Rotation in Cropping.—Importance and necessity of rotation; principles underlying it; rotations suitable to different kinds of soil; examination and criticism of different systems of rotation.

Buildings.—Location of house, barn and stables; stables for horses, sheep and cattle; arrangement of farm buildings.

Miscellaneous.—Roads, lanes, fences.

Deepartment 2.—Natural Science.

Chemical Physics.—Matter; accessory and essential properties of mattter; attraction; various kinds of attraction—cohesion, adhesion, capillary, electrical, and chemical; specific gravity; weights and measures; heat, measurement of heat, thermometers, specific and latent heat; sources, nature and laws of light.

Inorganic Chemistry.—Scope of subject; elementary and compound substances; chemical affinity; symbols; nomenclature; combining proportions by weight and by volume; atomic theory; atomicity and basicity; oxygen and hydrogen; water—its nature, functions, decomposition and impurities; nitrogen; the atmosphere—its composition, uses, and impurities; ammonia—its sources and uses; nitric acid and its connection with plants.

Human Physiology and Hygiene.—Description of the different tissues of the body; alimentary system; circulatory system; nervous system; importance of ventilation and the influence of food on the body; remarks on the proper care of the body and attention to its surroundings in order to keep it in a continual state of health.

Zoology.—Distinctions between animate and inanimate objects; distinctions between plants and animals; basis and classification among animals; leading character of each sub-kingdom, with special reference to classes or animals connected with agriculture.

DEPARTMENT 3.—VETERINARY SCIENCE.

Anatomy and Physiology of the horse, ox, sheep and pig; osseous system, muscular system, syndesmology, plantar system and odontology.

DEPARTMENT 4.—ENGLISH.

Composition.—The sentence, paragraph and period; capitals and punctuation. Exercises in composition.

English Classics.—Critical study of Thomson's "Seasons"—Autumn.

DEPARTMENT 5.—MATHEMATICS.

Arithmetic.—Review of subject, with special reference to farm accounts. Interest, discount, stocks, and partnership.

Mental Arithmetic.—Calculations in simple rules.

Book-keeping.—Subject commenced.

FIRST YEAR.—(Continued.)

Winter Term—22nd January to 16th April.

DEPARTMENT 1.—AGRICULTURE.

Breeding, rearing and feeding of animals. Points to be considered in deciding what kind of animal to keep.

Cattle.—History and characteristics of Shorthorns, Herefords, Aberdeen-Angus Polls, Ayrshires, Jerseys, Guernseys, Holsteins, Devons, Galloways, etc.; grade cattle; milch cows—points of a good milch cow; breeding generally; pedigree.

Sheep.—Breeds of sheep generally considered; crosses between different breeds compared; quality, quantity, and uses of different kinds of wool.

DEPARTMENT 2.—NATURAL SCIENCE.

Inorganic Chemistry (Continued).—Carbon; combustion; carbonic acid and its relation to the animal and vegetable kingdom; sulphur and its compounds; manufacture and uses of sulphuric acid; phosphorus; phosphoric acid and its importance in agriculture; chlorine—its bleaching properties; bromine; iodine; silicon; potassium; calcium; magnetism; iron, etc,

Organic Chemistry.—Constitution of organic compounds; alcohols, aldehydes, acids and their derivatives; formic, acetic, oxalic, tartaric, citric, lactic, malic, uric and tannic acids. Constitution of oils and fats—saponification; sugars, starch, cellulose; albuminoids, or flesh formers and their allies; essential oils; alkaloids—morphine and quinine; classification of organic compounds.

Zoology (Continued).—Sub-kingdoms further described; detailed account of some injurious parasites, such as "liver fluke," "tapeworm," "trichina," etc.; insects—their influence on plant life; corals and mollusks as agents in the formation of soil; vertebrates; with special reference to those of importance in the economy of the farm.

Lectures illustrated by specimens and diagrams.

Department 3.—Veterinary Science.

Veterinary Anatomy.—Anatomy and physiology of the horse, ox, sheep, and pig—digestive system, circulatory system, respiratory system, urinary system, nervous system, sensitive system, generative system, tegumental system.

Department 4.—English.

Composition.—Exercises continued; abstracts of speeches and essays; letter writing.
English Classics.—Critical study of Southey's "Life of Nelson."

Department 5.—Mathematics and Book-keeping.

Arithmetic.—Equation of payments; percentage; profit and loss; stocks; partnership; exchange.

Book-keeping.—Business forms and correspondence; general farm accounts; dairy, field and garden accounts.

FIRST YEAR.—(Continued).

Spring Term—17th April to 30th June.

Department 1.—Agriculture.

Preparation of Soil.—Modes of preparation for different crops, and various kinds of soil.

Seeds and Sowing.—Testing the quality of seed; changing seed; quantity per acre; methods of sowing.

Improvement of Lands.—Drainage; ordinary cultivation; subsoiling; fallowing: manuring. Farm-yard manure and management of the same; the properties, application, and uses of special fertilizers—lime, plaster, salt, bone-dust, superphosphates, etc.
Stephenson

Roots.—Cultivation of roots and tubers—effects of each kind on soil.

Green Fodders.—The cultivation and management most appropriate for each.
Management of pastures; harvesting and preparing crops for market or one's own use; crops for current year examined.

Department 2.—Natural Science.

Geology.—Connection between geology and agriculture; classification of rocks—their origin and mode of formation, changes which they have undergone after deposition; fossils—their origin and importance; geological periods and characteristics of each.
Geology of Canada; with special reference to the nature and economic value of the rock deposits; glacial period and its influence on the formation of soil.
Lectures illustrated by numerous specimens and diagrams.

Botany.—Full description of the seed, roots, stem, leaves and flower. Plants are brought into the lecture-room and analyzed before the class so as to render students familiar with the different organs and their use in the plant economy.
Lectures also illustrated by excellent diagrams.

DEPARTMENT 3.—VETERINARY SCIENCE.

Materia Medica.—The preparation, doses, action and use of about one hundred of the principal medicines used in veterinary practice.

DEPARTMENT 4.—ENGLISH.

English Grammar and Composition.—Mason and Williams.

DEPARTMENT 5.—MATHEMATICS.

Mensuration.—Mensuration of surfaces—the square, rectangle, triangle, trapezoid, regular polygon, circle. Special application to the measurement of lumber. Mensuration of solids; special application to the measurement of timber, earth, etc.

SECOND YEAR.

Fall Term—1st October to 22nd December.

DEPARTMENT 1.—AGRICULTURE.

Experimental Plots.—The results of last season's experiments with crops and animals; liability to disease; effects of various manures on different crops, etc.

Farm Management.—Detailed account of the treatment of each field; results from different kinds of seed and soil; effects of manure; harvesting, storing and threshing of crops; fall ploughing, subsoiling, etc.

Stock Feeding.—Value of feeding materials; estimate for winter keep of live stock; housing, feeding and fattening; points to be observed in selecting animals for fattening; feeding experiments; common diseases of animals; management of animals on pasture; value of green fodder. Dairy management and cheese-making.

DEPARTMENT 2.—NATURAL SCIENCE.

Agricultural Chemistry.—Connection between chemistry and agriculture; the various compounds which enter into the composition of the bodies of animals; the chemical changes which food undergoes during digestion; chemical changes which occur during the decomposition of the bodies of animals at death; the functions of animals and plants contrasted; food of plants, and whence derived; origin and nature of soils; classification of soils; causes of unproductiveness in soil and how detected: preservation, development, and renovation of soils; manures classified; the chemical action of manures on different soils; commercial valuation of fertilizers.

Horticulture.—Ontario as a fruit-growing country; the natural divisions into which it may be divided for growing fruit; detailed account of the operations, layering, grafting, budding, pruning, etc.; laying out and cultivation of an orchard; list of fruits best suited for general purposes, with best methods for their cultivation; remarks on gardening as a source of profit; plants best adapted for the purpose of bedding and potting.

Lectures illustrated by practical work in the garden and specimens in the class-room.

DEPARTMENT 3.—VETERINARY SCIENCE.

Pathology.—Osseous System.—Nature, causes, symptoms and treatment of diseases of bone, as splint, spavin, ringbone, etc.

Muscular System.—Nature, causes and treatment of flesh wounds, etc.

Syndesmology.—Nature, causes, symptoms and treatment of curb, bog-spavin and other diseases of the joints.

Plantar System.—Nature, causes, symptoms and treatment of corns, sand-crack, founder and other diseases of the feet.

Odontology.—Diseases of the teeth and treatment of the same.

Department 4.—English.

English Classics.—Critical study of Shakespeare's "Julius Cæsar."

Department 5.—Mathematics.

Dynamics.—Motion, forces producing motion, momentum; work; the simple machines, etc.

Drainage.—General principles; how to lay out a system of drains; how, where and when to commence draining; depth of drains and distances apart; grades; cost of draining.

SECOND YEAR—(Continued).

Winter Term—22nd January to 16th April.

Department 1—Agriculture.

Capital required in farming; laying out of farms; general management and economy; cost of production; buying, selling and marketing.

Management of cattle, sheep and other animals in winter; breeding generally considered; special management of ewes before, during and after the season of lambing; treatment of other animals in parturition; rearing of lambs, calves and pigs; washing and dipping of sheep, etc., etc.

Arboriculture.—Importance of the subject and its special application to North America; what is being done in the conservation and replanting of forests in other countries: the objects of conserving and replanting—shelter for crops, animals and dwellings, regulation of temperature and rain-fall, ornament and profit; requisite proportions of tree surface to that under agricultural crops; existing condition of forests in North America; adaptability of soils and climate to rapid results; what parts of the country should be conserved, and what parts replanted; conservation of indigenous forests generally considered; special attention to the care of young natural forest trees.

Department 2.—Natural Science.

Agricultural Chemistry.—Continuation of the subject from preceding term, as follows: Composition of plants in relation to the soils upon which they grow; rotation of crops; the classification of fodders according to their chemical composition, and a general treatment of the science of cattle feeding; relation of feeding to manure; chemistry of the dairy.

Entomology.—Importance of the subject to agriculturists; beneficial and injurious insects—their habits, and the best means of checking the ravages of the latter.

Lectures illustrated by specimens.

Meteorology.—Relation of Meteorology to agriculture; composition and movements of the atmosphere; description of the barometer, different kinds of thermometers, pluviameter, anemometer and how to read them; temperature, its influence on agriculture the elements which are to be considered in the discussion of climate; the principles considered in forecasting the weather.

Lectures illustrated by instruments referred to.

Department 3.—Veterinary Science.

Digestive System.—Nature, causes, symptoms and treatments of spasmodic and flatulent colic, inflammation of the bowels, acute indigestion, tympanitis in cattle, impaction of the rumen, and many other common diseases.

Circulatory System.—Description of the diseases of the heart and blood.

Respiratory System.—Nature, causes, symptoms and treatment of catarrh, nasal-gleet, roaring, bronchitis; pleurisy and inflammation of the lungs, etc.

Urinary System.—Nature, causes, symptoms and treatment of inflammation of the kidneys, etc.

Nervous System.—Nature, causes, symptoms and treatment of lock-jaw, string halt, etc.

Sensitive System.—Nature, causes, symptoms and treatment of the diseases of the eye and ear.

Generative System.—Nature, causes, symptoms and treatment of abortion, milk fever, etc.

Tegumental System.—Nature, causes, symptoms and treatment of scratches, sallenders, mallenders, parasites and other diseases of the skin.

Department 4.—English Literature and Political Economy.

English Classics.—The critical study of Shakespeare's "Macbeth."

Political Economy.—Utility; production of wealth—land, labour, capital; division of labour; distribution of wealth; wages; trades unions; co operation; money; credit, credit cycles; functions of government; taxation, etc.

Department 5.—Mathematics.

Statics.—Theory of equilibrium; composition and resolution of forces; parallelogram of forces; moments; centre of gravity, etc.

Hydrostatics.—Transmission of pressure; the hydraulic press; specific gravity; density; pumps, siphons, etc.

Book-keeping.—Review of previous work.

SECOND YEAR—(Continued).

Spring Term—17th April to 30th June.

Department 1.—Agriculture.

Review of past lectures with special drill on outside work. Reasons for management, etc.

Department 2.—Natural Science.

Determination of soils and fertilizers by physical properties.

Analytical Chemistry.—Chemical manipulation, preparation of common gases and reagents; operations in analysis—solution, filtration, precipitation, evaporation, distillation, sublimation, ignition and the use of the blow-pipe; testing of substances by reagents; impurities in water; adulteration in foods and artificial manures; injurious substances in soils.

Systematic and Economic Botany.—Classification of plants and characters of the most important orders.

This course is illustrated by a large collection of plants in the college herbarium; and also by analysis of several plants collected in the fields and woods of the farm.

Green-house Plants.—Special study of all plants grown in our green-houses, and the shrubs, etc., on the lawn.

Department 3.—Veterinary Science.

Materia Medica.—The preparation, actions, uses and doses of medicines—continued from the spring term of the first year. Lectures on sperial subjects, such as pleuro-pneumonia, the rinderpest, tuberculosis, etc.

Veterinary Obstetrics.—Description of fœtal coverings. Pneumonia in connection with puberty, œstrum, gestation, sterility, abortion, normal and abnormal parturition. Diseases incidental to pregnant and parturient animals.

Department 4.—English.

English Classics.—The critical study of Milton's "L'Allegro" and "Il Penseroso."

Department 5.—Mathematics.

Surveying and Levelling.—Fields surveyed with chain and cross-staff; measurements of heights.

Road-Making.—Determination of proper slopes; shape of road bed; drainage of roads; friction on different roads; various road coverings; the maintenance of roads; cost, etc.

APPENDIX 2.

TIME TABLE FOR FALL TERM.

The following Time Table indicates our class-room work from the 1st October to the 22nd December.

TIME TABLE.

First Year.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
8.45	Agriculture.	Agriculture.	Agriculture.	1. Bookkeeping. 2. Arithmetic.	Agriculture.
9.45	English Literature.	Physiology and Hygiene.	English Literature.	3. Physiology and Hygiene.	Chemistry.
10.45	Chemistry.	Veterinary Anatomy.	Chemistry.	Veterinary Anatomy.	Arithmetic.

Second Year.

Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
8.45	Mathematics.	English Literature.	Mathematics.	English Literature.	Horticultnre.
9.45	Agriculture.	Agriculture.	Horticulture.	Drawing.	Agriculture.
10.45	Veterinary Pathology.	Agricultural Chemistry.	Veterinary Pathology.	Agricultural Chemistry	Agricultural Chemistry.

APPENDIX 3.

EXAMINATION PAPERS.

I. PAPERS SET AT THE EXAMINATIONS, EASTER, 1887.

FIRST YEAR.

LIVE STOCK, (CATTLE.)

Examiner: Wm. Brown.

1. Classify the breeds at this farm into the strictly dairy and beef, and say which can be taken as part of both.

2. Name those breeds that have been specially improved, and indicate how the improvements were carried out.

3. Compare the form and characteristics of the Devon and Durham.

4. In what respects does the Ayrshire cow differ from the model cow that we have studied, without reference to breed.

5. What would guide you in the choice of store cattle to be put up in October, and sold in May for exportation?

6. Feeding for beef includes other considerations; specify the other principal ones in order of importance. Explain fully.

7. What is a "Ration?" Explain the general one at the Ontario Experimental Farm this winter.

First Year.

LIVE STOCK, (SHEEP.)

Examiner: Wm. Brown.

1. Compare the points and characteristics of the Oxford and Cotswold.

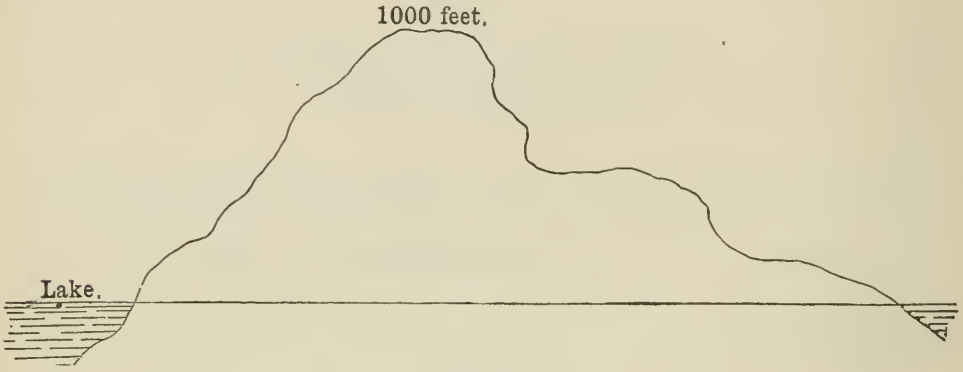
2. Report on the accompanying sample of wool.

3. What think you of the Southdown and Cheviot for average Ontario conditions? Explain fully.

4. Make a table shewing the *Maturing*, *Flesh Value*, *Wool Texture*, and *Weight*, of the Leicesters, Hamps and Shrops.

EASTER EXAMINATIONS, 1887.—Continued.

5. Required a breed to do best on natural pasture on a 1,000 acre island of this form in Lake Nipissing. Give full reasoning, and supply any omissions in the information given.



FIRST YEAR.

LIVE STOCK, (PIGS.)

Examiner: P. J. WOODS.

1. Describe the standard points of beef steers, and what would guide you in selecting store steers.

2. Write fully on the following questions:—
   General principle of breeding.
   General points of excellence in a good flock of sheep.

3. How would you keep up fertility in sows?

4. Name the three best breeds of pigs suitable for our Canadian markets. Give reasons for your answers.

5. How would you prepare a pen for a sow about to pig? Give treatment of sow and pigs until weaning time.

FIRST YEAR.

ORAL EXAMINATION, (CATTLE.)

Examiner: WM. BROWN.

1. Without reference to breed, describe the general appearance of the cows, and show the prominently *good* and *poor* points of each as *milkers*, indicating which is likely to be the *best one all over*.

2. Quality, fleshing, and form, in a fattening steer. Give prize for these only, after a full explanation of them on each animal.

FIRST YEAR.

ORAL EXAMINATION, (SHEEP.)

Examiner: WM. BROWN.

1. What are the two principal differences between the Oxford rams?

2. Allowing for age, which is the best Shrops ram?

3. What objections have you to the Oxford ewes as a pair for exhibition purposes?

EASTER EXAMINATIONS, 1887.—Continued.

FIRST YEAR.

DAIRYING.

Examiner: J. W. Robertson.

1. Give details of most economical method of rearing calves.

2. Describe the points of an ideal dairy cow.

3. What effects are observed when salt is withheld from milking cows?

4. What are the churning temperatures at different seasons, and why is variation necessary?

5. Name and describe the preparation of butter packages best suited for creamery use.

6. State what butter is, and describe its commercial qualities with their comparative values.

7. Give a scale of points for use in judging at competitions for milking cows.

8. Describe the lactoscope.

9. What is rennet, and what is known of its action in cheese making?

FIRST YEAR.

INORGANIC CHEMISTRY.

Examiner: C. C. James, M. A.

1. Sketch the apparatus you have seen used in the making of any gas. Give properties of the gas and equation representing the reaction taking place.

2. Define Valence, Chemism, Combustion, Heat, Force, Reduction, Radical, Triad, Molcule, Matter.

3. Define and give two examples of Potential Energy.

4. Define Acid, Base, Alkali, Salt. Give the names and symbols of four acids, and the salts of K, Ca, and Fe derived from same.

5. Name and give composition of the ordinary forms of coal.

6. Distinguish between the setting of ordinary Mortar and of Plaster of Paris. Give equations.

7. State the chemical composition of Marble, Graphite, Steel, Chalk, Pig-iron, Calcite, Apatite, Land-plaster, Superphosphate, Gypsum. Give names and symbols.

8. Give the method of making Carbonic Acid Gas. State its properties.

9. Determine the No. of lbs. of water that can be made from H of 25 lbs. of H Cl, and the O of 25 lbs. of K Cl O_3.

FIRST YEAR.

ORGANIC CHEMISTRY.

Examiner: C. C. James, M.A.

1. Give Chemical symbols and names of Wood Spirit, common Alcohol, common Ether, Firedamp, Chloroform, Milk, Sugar, Stearin, Vinegar.

2. *Alcohol*—State the process for the formation of spirits from barley. Give chemical equations wherever possible.

EASTER EXAMINATIONS 1887—Continued

3. *Fats*—Name the most important. Explain the rancidness of Butter.

4. *Carbohydrates*—Define and name the most important and give symbols for same.

5. *Albuminoids*—What are they? Name three. State the foods containing them in excess.

6. *Alkaloid*—Name five, giving source of the same.

7. Explain, as far as possible, Souring of Milk, Curdling of Milk, the formation of White Wine Vinegar, Fermenting of Wine, Digestion of Starch. Give equations where possible.

FIRST YEAR.

ZOOLOGY.

Examiner: J. Hoyes Panton, M.A., F.G.S.

1. Contrast organic with inorganic bodies, and give the chief characteristics of living bodies.

2. Name the different forms of asexual reproduction observed in the animal kingdom, and give examples stating the sub-kingdoms to which they belong.

3. Give the character of the class *Aves*, and name the song birds of Ontario.

4. Describe the different modes by which the blood is purified in animals, and give examples of each.

5. Show in what respects man differs largely from the lower animals, and give some of the chief objections to the theory of Evolution.

6. Name some interesting extinct forms of animal life and the classes to which they belong.

7. Describe fully the life-history of the animal which causes "rot" in sheep.

8. Explain the term "Metamorphosis" as applied to insects, and illustrate it by referring to the Crane fly.

9. Identify the specimens before you.

FIRST YEAR.

VETERINARY ANATOMY.

Examiner: F. C. Grenside, V. S.

1. Describe how the walls of the thorax and abdomen are formed.

2. Name the organs of prehension in the horse, ox and sheep; and explain why the ox can breathe through his mouth and the horse cannot.

3. Give the number and arrangement of temporary and permanent teeth in the horse, ox, and sheep.

4. Describe the windpipe, bronchi, and bronchial tubes.

5. Describe the arrangement and appearance of the mucous coat of the stomach of the horse.

6. Name the secretions that convert the chyme into chyle.

7. Describe the forces that accomplish defoccation, urination, and parturition.

8. Describe how rumination is believed to be effected.

9. Describe the ventricles of the heart.

10. Explain the course of the circulation of the blood

EASTER EXAMINATIONS, 1887.—Continued.

FIRST YEAR.

ENGLISH LITERATURE.

SOUTHEY'S "LIFE OF NELSON."

Examiners : S. C. SMOKE, B.A., AND JAS. MILLS, M.A.

1. Sketch briefly the life of Nelson, and state definitely your estimate of his character as a man and as a naval officer, giving specific reasons for your conclusions regarding him.

2. Account for the demonstration in honor of Nelson at Yarmouth, Ipswich and London, in the year 1801.

3. Name the rulers of England, France, Denmark, Sweden and Russia in the year 1801.

4. What led to the battle of Copenhagen?

5. The battles of Copenhagen and Trafalgar : Give the date, the locality, the parties engaged, and a brief account of each. (*a*) What did Nelson say is necessary in order "to negotiate with effect?" (*b*) What kind of measures did he say "are the safest?" (*c*) How did he settle the quarrel between Collingwood and Rotherham? (*d*)What famous signal did he make to his fleet just before the battle of Trafalgar?

6. What English poet has celebrated the battle of Copenhagen?

7. What are Elsinore and Cronenburg Castles noted for?

8. Write a biographical note on Tyco Brahe.

9. Give the rules for paragraphing, and criticise the first paragraph in Chapter VII. of Southey's "Life of Nelson."

10. Criticise the English of the following passages and rewrite each of them in better form :

(*a*) "Denmark had profited with all activity, of the leisure which had impolitically been given her."

(*b*) "Here you are, with almost the safety—certainly the honor—of England more entrusted to you than ever yet fell to the lot of any other British Officer."

(*c*) "It was liable to long delays and to accidents of ships grounding."

(*d*) "Upon the nearest point of land to the Swedish coast."

(*e*) "The Danish shores consist partly of ridges of sand, but more frequently their slopes are covered with rich wood."

11. Write a summary of the life of Southey, naming his principal works, and the most marked peculiarities of his style.

12. Note a few of the leading characteristics of the period of English literature to which Southey belonged ; name the principal contemporary writers ; and account for the period being so productive in literary work.

FIRST YEAR.

ARITHMETIC.

Examiner : E. LAWRENCE HUNT.

1. If a cow gives 6,000 lbs. of milk in a year, and ten quarts of milk makes one lb. of butter worth 20c. a lb., and skim milk and buttermilk are worth 2½c. a gallon, find the value of the milk and the butter from the cow in one year.

EASTER EXAMINATIONS, 1887.—Continued.

2. If a steer is fed each day 8lbs. hay at $8 a ton, 4lbs. oats at 35c. a bushel, 3lbs. pease at 55c. a bushel, 2 lbs. barley at 60c. a bushel, with some cut straw, and if it gains 2½ lbs. in weight each day, and sells for 6½c. a lb. (live weight,) find the daily profit.

3. If a farm of 160 acres is worth $85 an acre, including buildings, and the stock and implements worth $1,100, what must be the farmer's yearly profits to allow him a salary of $850 a year, and 7 per cent. interest on his money?

4. For what purpose are taxes levied? In a school section there are forty families, each with an average farm of 150 acres, valued at $50 an acre. If the annual cost of school maintenance is $420, find the rate of taxation (in mills) for school support; also, the yearly fee A pays for each of three children, if his farm of 125 acres is valued at $40 an acre.

5. Why are duties imposed on imported goods? Distinguish *ad valorem* and *specific* duties. If the selling price of an article is $95 when there is a duty of 30 per cent., what would be the selling price if there was a duty of only 12 per cent., the merchant's profit in each case being 25 per cent. on his outlay, and the freight being $5.

6. A sends wheat to B, which he sells on a commission of 2%. He deducts his commission and sends A his note for balance, drawn Jan. 1st, '87, and due one month hence, which A gets discounted at the bank, January 15th, at 8%, receiving $90.85 for the note: if B sold the wheat for 76⅘c. a bushel, find the number of bushels A sent him.

FIRST YEAR.

BOOK-KEEPING.

Examiner: E. Lawrence Hunt.

1. Explain the terms (a) Promissory Note; (b) Payee; (c) Draft. Write the form of (a), also receipt given in the case of VI. (c).

2. Enumerate the accounts you would open on an ordinary farm of 150 acres.

3. What does Loss and Gain account contain when completed?

4. Explain how the following are closed—*Cash, Cows, Farm Produce, Loss and Gain, Balance.*

5. Make out and close an account with *pigs.*

6. State how the several accounts would be affected by the following:—

(*a*) Sold P. Black 100 bushels wheat @ 80c. a bushel,
(*b*) Bought a cow from S. Thomas, $35.
(*c*) Paid S. Harvey (permanent hand,) $40.
(*d*) Sold S. White 80 lbs. butter @ 20c., taking in payment 10 lbs. tea @ 75c., and balance cash.
(*e*) Built an addition to the barn at a cost of $600 cash, and twenty days labour of myself and two permanent hands.
(*f*) Sowed 20 bushels fall wheat, for which I paid $1.10 a bushel.

N.B.—Fifteen marks given for excellence of arrangement and writing.

SECOND YEAR.

AGRICULTURE.

Examiner: Wm. Brown.

1. In the general management and economy of an Ontario farm, why do we say that banking money is not necessarily a sign of well doing?

EASTER EXAMINATIONS, 1887.—Continued.

2. What is implied in the following statements :—
   (*a*) The reasonableness of some mortgages.
   (*b*) The danger of too much land.
   (*c*) The necessity of better co-operation.
   (*d*) The burying of money in fences and homes.
   (*e*) Appreciating the importance of so-called "little things."
3. Criticise the *arrangement* of our new Farm Buildings.

SECOND YEAR.

CATTLE AND SHEEP.

Examiner: Wm. Brown.

1. What are the different methods of breeding, and specify the known principles of the art.

2. Report on the general character of the following pedigree ; shew all its connections, and say why it is or is not admissible to the Dominion Herd Book.

3. Make comparative notes on the adaptability of the Hereford and Galloway for our North West ranches.

4. What are the economical and scientific features of our 1886-7 feeding ration for all cattle ?

5. Compare the Oxford and Shrops breeds of sheep.

6. Lambing time in March and April with us : what does this imply for the best results ?

SECOND YEAR.

LIVE STOCK.

Examiner: P. J. Woods.

1. Describe what a beef steer fit for the shambles should be, and name *five* principal points in a beef steer that a butcher would expect to realize a profit from. Give reasons for your answers.

2. Give the essential points in a well bred Berkshire pig.

3. How were the following original breeds of pigs improved : Suffolk, Essex, and large Yorkshire ?

4. Write fully on the management of a sow and her pigs, from two weeks before she is expected to farrow, until the pigs are two weeks old.

5. Give management of a ram and flock of ewes from rutting season until the lambs are weaned.

SECOND YEAR.

ORAL EXAMINATION (CATTLE.)

Examiner: Wm. Brown.

1. Show five actually distinct differences in the one cow from the other, as evidence of a machine better adapted to milk production.

2. Exemplify with the steer the terms (1) irregular fleshing, (2) hard handling, (3) firm handling, (4) well filled, and (5) ripeness.

EASTER EXAMINATIONS, 1887.—Continued.

SECOND YEAR.

ORAL EXAMINATION, (SHEEP.)

Examiner: Wm. Brown.

1. Point out and compare all the evidences of *Quality* in the two Rams.
2. Compare the Leicester and Cheviot as regards *Form* and *Wool.*

SECOND YEAR.

DAIRYING.

Examiner: J. W. Robertson.

1. Describe "the points" of an ideal dairy cow.
2. What is milk?
3. State the best method and conditions for the separation of cream by the natural method.
4. For what purposes are the Ayrshire, Jersey, Holstein, and Short Horn breeds of cows respectively best adapted?
5. What is the method of preparation and use of a "fermentation starter" in butter making.
6. What are the distinctive features in the process of making Cheddar cheese.?
7. Describe the qualities in a perfect cheese.
8. What steps need be taken to establish satisfactorily a Joint Stock Cheese Factory or Creamery?
9. What are the characteristics of salt suitable for dairy use?

SECOND YEAR.

AGRICULTURAL CHEMISTRY.—Part I.

Examiner: C. C. James, M.A.

1. *Humus*—Discuss its origin, composition, uses, treatment and value.
2. *Nitrification*—Summarize as far as possible the experiments that determined its nature.
3. *Drainage Water*—Brief notes on its composition.
4. *Lime*—State the sources of lime as a fertilizer; also give directions for the application of lime fertilizers.
5. How will the nitrogen in a soil be affected by a Norfolk rotation (average crops and average manuring)?
6. Give reasons for rotation of crops and general principles for guidance in same.
7. Turnips, peas, barley. wheat, clover, oats; (*a*) criticise this rotation; (*b*) rearrange, if preferred, giving reasons for so doing.
8. With what and in what manner would you fertilize *each* of the crops in 7?

EASTER EXAMINATIONS, 1887.—Continued.

SECOND YEAR.

AGRICULTURAL CHEMISTRY.—Part II.

Examiner: C. C. James, M.A.

1. Give the water % and N. R. of ten common Ontario fodders.

2. Distinguish amides, albuminoids and alkaloids.

3. Discuss the chemical composition of hay and show how it is affected.

4. *Fermentation*—Define; state the principal forms, and represent by chemical equations those taking place in milk.

5. Brief notes on feeding for milk, for beef, for wool, for work.

6. Specific gravities of two samples of milk are 1.038 and 1.025. What conclusions do you draw? Why?

7. Distinguish colostrum and milk, sour milk and koumis.

8. State how butter, cheese and lard are adulterated.

9. Trace carefully the cause of change from the free nitrogen of the air to *butyrate of Ammonia.*

SECOND YEAR.

ENTOMOLOGY.

Examiner: J. Hoyes Panton, M.A., F.G.S.

1. Define an insect. Describe the circulating and respiratory systems of such, and compare the pupa condition in at least four different orders of insects.

2. Name the orders embracing insects characterized by having masticatory mouths.

3. Give brief notes on arsenical compounds used as insecticides; the mode of application.

4. Mention the best preventives against insect injury.

5. Describe fully, as illustrated in the museum cases, the development of *Pieris Rapae and Danais Archippi.*

6. Give a remedy for canker worm, codling moth and notes on the crane fly.

7. Arrange the insects which we have considered in the orders to which they belong.

8. Give remedies for the Anthomigian flies. Name the plants affected and describe the pupa condition.

9. Name the four largest larvæ we have discussed and give characters which distinguish them from each other both in the larval and pupa condition.

10. Identify the specimens before you, name the plants they affect, and give remedies for Nos. 2, 4, 6, 8, 10.

SECOND YEAR.

VETERINARY PATHOLOGY.

Examiner: F. C. Grenside, V.S.

1. Give the symptoms of bruised feet, gathered nails, and corns in the horse.

2. State how to determine the difference between foot and shoulder lameness.

EASTER EXAMINATIONS, 1887.—Continued.

3. Give the symptoms of foul in the foot of cattle and foot-rot in sheep, and the treatment and means of precaution.

4. Mention the forms of hernia that are often congenital, and the course that should be pursued with regard to them.

5. Give the cause of lymphangitis and the proper treatment.

6. Describe the nature of eczema, mange and ringworms, and the treatment of the former and latter conditions.

7. Give the causes, treatment and results of mamumitis in the cow and sheep.

8. Describe the preventible causes of digestive disorders in the horse.

9. Give the causes, symptoms and treatment of bloating in the ox and sheep.

10. Give the symptoms and treatment of spasmodic colic.

SECOND YEAR.

PRACTICAL HORSE.

Examiner: F. C. Grenside, V.S.

1. Explain the ill effects of leaving a horse's shoes on too long.

2. Describe how to prepare a horse's foot for the reception of the shoe.

3. Give an explanation of the circumstances under which it is advisable to place an animal in slings, and the advantages to be attained by slinging.

4. Name and describe the malformations to which the horse's mouth is subject.

5. State the causes of imperfect mastication in the horse.

SECOND YEAR.

PRACTICAL HORSE (Oral).

Examiner: F. C. Grenside, V.S.

1. Name the different methods of restraining a horse.

2. Locate curb, spavin, and thoroughpin.

3. Tell what is the desirable conformation of the fore extremity below the knee.

4. Say what conformation of the middle piece is desired, not mentioning the back or underline.

SECOND YEAR.

ENGLISH LITERATURE.

I. Shakespeare's "Macbeth."

Examiner: S. C. Smoke, B.A.

1. State briefly the argument of the play, pointing out particularly the part which the witches are made to play.

2. Compare the prevalence of the belief in witchcraft of the time of Shakespeare, with that of our own time, and shew the influence of that belief on this play. Comment on Dr. Johnson's remark that "the greatest part of mankind have no other reason for their opinions than that they are in fashion."

EASTER EXAMINATIONS, 1887.—Continued.

3. In speaking of the appearance of Banquo's ghost, Taine says, "This phantom which Shakespeare summons is not a mere stage trick; we feel that here the supernatural is unnecessary, and that Macbeth would create it even if hell would not send it." Explain Taine's meaning here.

4. "As whence the sun gives his reflection,
Shipwrecking storms and direful thunders break,
So from that spring whence comfort seemed to come
Discomfort swells."

Name the principal figure employed here, and shew its full force. Quote from this play any other example of the same figure.

5. "Till he disbursed . . . . .
Ten thousand dollars to our general use."

Is the dollar an English coin?
Account for its mention here.

6. Quote the passage ending—

"And nothing is but what is not,"

and comment fully upon the meaning of this sentence. What is a paradox?

7. Analyze syntactically—

"More is thy due than more than all can pay."

8. "And his great love, sharp as his spear, hath *holp* him." What is the modern form of *holp?* Give any other example of a similar difference between old and modern forms.

9. Define, as used in this play, the words *fantastical*, *illness*, *ecstasy*, *owe*, *missives*, and *minutely*.

10. "Come, sisters, cheer we up his sprights." Give the different forms and meanings of the word *sprights*.

11. Explain fully what is meant by the following expression—

"Keep thy word of promise to our ear and break it to our hope."

12. State by whom and under what circumstances the following passages are spoken, and explain the meaning of each passage:—

(*a*) Nothing in his life
Became him like the leaving it.

(*b*) That is a step
On which I must fall down, or else o'erleap,
For in my way it lies.

(*c*) What would'st thou highly
That would'st thou holily.

(*d*) This even handed justice
Commends the ingredients of our poisoned chalice
To our own lips.

(*e*) I dare do all that may become a man,
Who dares do more is none.

(*f*) Where we are, there's daggers in men's smiles;
Nought's had, all's spent.

(*g*) Where our desire is got without content.

(*h*) Thou hast no speculation in those eyes.

13. Parse the words *there's* and *men's* in extract (*f*), question 12.

EASTER EXAMINATIONS, 1887.—Continued.

14. Quote the passages in which occur the following expressions :—
(*a*) He wants the natural touch.
(*b*) The seer, the yellow leaf.
(*c*) Cans't thou not minister to a mind diseased ?

II. Hamlet and Richard II.

1. Quote from Hamlet the passages beginning—"Who would fardels bear," and ending "The pale cast of thought;" and explain carefully the meaning of the last two lines of the passage.

2. Quote from Richard II. the passage beginning—"This blessed plot, this earth," and ending "Rotten parchment bonds."

SECOND YEAR.

POLITICAL ECONOMY.

Examiner: W. A. Douglas, B.A.

☞ Give brief answers.

1. The four parts of Political Economy are Nature, Consumption, Production and Distribution of Wealth. To which class do the following facts belong ?

(*a*) Work in the best manner.
(*b*) "Rents rise from the fact that different pieces of land are not equally fertile."
(*c*) "Wealth is anything which is actually useful to us."
(*d*) "The slaveholder appropriated all the product except enough to keep the slave alive."
(*e*) "Wages are increased by increasing the product."

2. *Production of Wealth* :—
(*a*) Name the elements necessary for production, distinguishing primary and secondary.
(*b*) In production there is always a certain ratio between product and effort that may be thus expressed $\frac{\text{product}}{\text{effort.}}$ Name three ways in which we try to increase the value of this ratio.
(*c*) What legislation is necessary to compel people to resort to the best methods, the best places, or the best time to produce wealth ?

3. *Division of Labour* :—
(*a*) Shew by an illustration that two men can make each other richer.
(*b*) Name a condition without which division of labour would be utterly impossible.
(*c*) Shew how division of labour may take place between nations.
(*d*) Give an illustration shewing how the labour of one man may save the labour of a hundred.

4. *Capital* :—
(*a*) Shew by a simple illustration how capital aids labour.
(*b*) Distinguish fixed from circulating. Can this distinction be clearly drawn ?

EASTER EXAMINATIONS, 1887.—Concluded.

5. *Distribution of Wealth :—*
   (*a*) Name and distinguish the divisions.
   (*b*) Which share continually increases in countries where population is increasing? Which for a number of years has declined? Which is disputed as to increase or decrease?
   (*c*) Which would be increased merely by increased density of population?
   (*d*) Which differs little, if anything, in location? Which differs enormously in different locations?
   (*e*) What is the current rate of interest? What the current rate of wages for unskilled labour? What is the rental per acre for farms in Wellington County?

6. *Values :—*
   (*a*) Shew that the measure of wealth by value is quite defective.
   (*b*) "In New South Wales water has been sold for three shillings a bucketful." Did this increased value indicate increased wealth?
   (*c*) Give examples of the following values—
      1. One that is permanent.
      2. One that may last for some years.
      3. One that vanishes almost instantaneously.
      4. One that is produced by labour.
      5. One that is produced by scarcity.
   (*d*) Can labour produce a value that will last forever?

SECOND YEAR.

MECHANICS.

Examiner : E. Lawrence Hunt.

1. Explain the terms—*momentum, work, force of gravitation, centre of gravity mechanical advantage.*

Mention two machines which work at a mechanical disadvantage.

Why is a fly-wheel used on some machines? What is the condition with reference to the centre of gravity that a body resting on a horizontal plane will stand? Give the reason.

2. Enunciate (*a*) the second law of motion, and (*b*) the parallelogram of forces.
   (*c*) and shew clearly that (*b*) follows from (*a*.)
   (*d*) Two forces of 220 lbs. and 280 lbs. act on a body at an angle of 45°, find the magnitude and direction of their resultant.

3. What fact in nature is taken advantage of in the (*a*) hydrostatic press, (*b*) common pump, (*c*) hydraulic ram, (*d*) siphon ; and mention one case in which (*d*) might be used on a farm.

4. In the hydraulic ram what proportion of the water that flows through the supply pipe is driven through the discharge pipe? (*b*) Clearly explain the mechanical principle.
   (*c*) If a spring supplies one gallon a minute, how long will it take to fill a cylindrical vessel in the barn, if the diameter is two feet and height seven feet? Supply the necessary data on which you base your calculation.

5. Find the atmospheric pressure in pounds, to the square inch, if it sustains a column of water thirty-three feet high, (a cubic foot of water weighs 1,000 oz.)

6. In the second system of pulleys, find the power necessary to raise a weight of 500 lbs., if there are three pulleys in the lever block.

II. PAPERS SET AT THE MIDSUMMER EXAMINATIONS, JUNE, 1887.

FIRST YEAR.

AGRICULTURE.

Examiner: Wm. Brown, Esq.

1. What is the importance of a proper physical condition of a soil?

2. To what extent can we follow a certain rotation of cropping? Give an example and shew in what way it may properly be departed from.

3. Name and criticise the accompanying sample of grain.

4. Specify the advantages of tillage; indicate its value relatively to manures, and say to what crops it is specially important.

5. What is a manure? Name the principal Canadian special fertilizers, and briefly sketch the best management of farm yard manure.

6. What are the principal circumstances that regulate the kind and character of farm implements and machinery.

7. Specify the advantages of underdrainage and explain the meaning of "lateral," "sole."

8. Describe the management of No. 6 field this year; say what have probably been the crops during the last three years and what they are likely to be for the next three.

9. What is your opinion of the importance of pasture and green fodders in the present farm practice of the province.

10. Name the essential features of modern butter making.

FIRST YEAR.

GEOLOGY.

Examiner: J. Hoyes Panton, M.A., F.G.S.

1. Give the characters of the metamorphic rocks, their economic products, and their distribution with reference to Ontario.

2. Describe the formation of a fossil by replacement and illustrate by examples.

3. Name the geological system represented in Ontario.

4. Explain the effects of rain as a denudating agent.

5. How is the system to which a rock belongs determined? Name the systems of the mesozoic age.

6. Give proofs for a glacial period in Ontario, and state its influence on the physical features of the country.

7. Outline LaPlace's theory regarding the origin of the earth.

8. Account for the absence of whole systems and formations from certain localities, and state which are missing in Manitoba.

9. Identify the specimen before you.

FIRST YEAR.

BOTANY.

Examiner: W. Nicol, B.A.

1. State the points of *similarity* and *difference* between the natural orders *cruciferæ* and *rosaceæ*.

MIDSUMMER EXAMINATIONS, 1887.—Continued.

2. Give the process of germination of an ordinary dicotyledenous seed.

3. Explain, with examples, the following botanical terms: (*a*) Monadelphous, (*b*) didynamous, (*c*) hypogynous, (*d*) rizome, (*e*) glomerule, (*f*) legume, (*g*) drupe, (*h*) pappus.

4. Give, with examples, the various forms of "Indefinite Inflorescence."

5. Shew the various adaptations for cross fertilization of flowers.

6. Describe a perfect flower, shewing the importance of the various organs.

7. Classify the indehiscent fruits, giving examples.

8. Analyze the plant before you.

FIRST YEAR.

VETERINARY MATERIA MEDICA.

Examiner: F. C. Grenside, V.S.

1. Give an explanation of the theories, with regard to the manner in which medicines establish their actions.

2. Describe the principles upon which the practice of allopathy is based.

3. Give a definition of the terms *anæsthetic*, *diuretic*, *sudorific* and *echolic*.

4. Describe the different forms in which medicinal agents are used for animals.

5. Name the physiological actions of aconite, and explain the indications for its use

6. Describe the best means of purging a horse.

8. What are the indications for the use of stimulants, and in what quantities are the different alcoholic preparations prescribed?

8. Which is the cheapest and most convenient preparation of belladonna for veterinary use? Give its actions and uses, and name its active principle.

9. What is carbonate of lime commonly called? Give a prescription for diarrhœa containing it.

10. Which is the most important alkaloid of cinchona bark? Give the actions and uses of cinchona and proper dose for horse.

FIRST YEAR.

ENGLISH GRAMMAR—THE NOUN.

Examiner: Jas. Mills, M.A.

1. Give a classification of nouns with a concise definition of each class and sub-class

2. What is meant by the term *inflexion* in grammar? Explain its application to the noun.

3. Distinguish sex and gender.

4. Enumerate the modes of denoting gender in English and give an example of each mode.

(*a*) Write out a list of the endings which are used to denote the feminine gender, with an example of each.

5. State the different ways in which we form the plural of nouns and give an example of each.

MIDSUMMER EXAMINATIONS, 1887.—Continued.

6. Write down the plural of *hero, canto, roof, fife, scarf, day, soliloquy, sheep, genus, radius, datum, cherub, brother, phenomenon,* and *die.*

7. Comment on modern English usage in regard to the number of the words : *Classics, means, news, riches, tongs, silks, wines,* and *folk.*

8. Give the rule for forming the plural of compound nouns.

9. Define *case.*

10. Give and illustrate the rules for forming *the possessive case.*

(*a*) What restriction does our present usage place on the use of the inflexion to denote possession ?

FIRST YEAR.

ENGLISH COMPOSITION.

Examiner : E. Lawrence Hunt.

1. Clearness, strength and unity are three essentials of a good sentence.

(*i*) What are the faults opposed to clearness ? Give examples.
(*ii*) State, with examples, the different ways strength is gained.
(*iii*) What is meant by the unity of a sentence ?

2. What is a *loose sentence ?* A *periodic sentence ?* Give an example of each. Which is the stronger ? Why ?

3. In a composition "there should be a judicious intermixture of short and long sentences." Why ? State the advantages of each.

4. Enumerate, with examples, the ways of changing adverbial clauses, in order to secure variety of expression.

5. Write a letter from Montreal asking for information regarding the course of study etc., at the Agricultural College.

6. Criticise the following sentences and re-write them when necessary :

(*a*) They preferred death rather than live thus.
(*b*) He forgets the gratitude he owes to those that helped all his companions when he was poor, and John Smith in particular.
(*c*) He had the entire monopoly of the whole salt trade.
(*d*) He lives in a stone house.
(*e*) There were a great quantity of students at the camp.
(*f*) If the formation of character is one of the aims of the teacher, as we have often insisted, let him be excessively cautious how he ridicules.

7. Write an essay on "The Improvement of Spare Time," with special reference to the life of a farmer.

FIRST YEAR.

MENSURATION.

Examiner : E. Lawrence Hunt.

1. A barn is 65 ft. long and 40 ft. wide. Find how many shingles are required to roof it, if each has an exposed surface of 8 ins. by 11 ins.; the length of each rafter being $\frac{3}{4}$ of the width of the barn. Also the cost @ $6 for 10 ft. square.

MIDSUMMER EXAMINATIONS, 1887.—Continued.

2. If the rain from the roof is collected into a cistern 7 ft. in diameter and 10 ft. deep, find the amount of rainfall required to fill the cistern.

3. A mow of hay is 30 ft. long, 20 ft. wide, and 12 ft. high. If a cubic yard weighs 196 lbs., find approximately the number of tons.

4. A stick of timber 35 ft. long tapers regularly, the circumference of one end is 11 ft. and of the other 18 ft. Find the volume by the approximate rule and by the exact rule.

5. The bottom of a vessel is 6 ft. long and 6 ft. wide, the top is 9 ft. long and 9 ft. wide. If the vessel is 5 ft. deep find the number of gallons it contains, also the number of square yards of zinc required to line the sides and bottom.

6. A B C D is a four-sided figure, A D and B C are parallel, the angle at A is 30° and the angle at B is 60°. Find the area and length of A B when A D is 100 ft. and B C 40 ft.

7. Explain clearly how the breadth of a stream may be found without crossing it.

The following two are for those who fail to do *three* of the above questions:

1. The radius of a circle is 35 ft. Find the circumference and the area. Also find the diameter and area when the circumference is 26.4 ft.

2. Form and solve a question similar to any you have done through the term concerning the excavation of trenches.

SECOND YEAR.

AGRICULTURE.

Examiner: Wm. Brown.

1. Apportion crops upon the average farm of 150 acres in Ontario as applicable to (1) a dairy district and (2) general farming.

2. In view of the increasing importance of dairying in Ontario, in what respects would you advise improvements in the summer and winter feeding of cows?

3. Pasture and green fodder in relation to cheapness of products; in what other respects are they conducive to *good husbandry* in these times?

4. Experimentation is a prominent feature of Canadian rural economy to-day. Name the principal rules that should guide us in such work.

SECOND YEAR.

CHEMISTRY.

Examiner: C. C. James, M.A.

Part I.—Theoretical.

1. Give the chemical composition of *Paris green*, *white lead*, *bleaching powder*, *apatite*, *wood ashes*, *coal ashes*, *dolomite*, *marl*, *clay*.

2. Explain chemically the dissolving and precipitation of limestone in the soil.

3. Name and state the principal chemical law in wet qualitative analysis.

4. Give the flame tests.

5. Distinguish mercurous and mercuric salts. Ferrous and Ferric salts (*a*) according to chemical composition, (*b*) practically by chemical tests.

MIDSUMMER EXAMINATIONS, 1887.—Continued.

PART II.—PRACTICAL.

Analyze the two samples. State on paper—

1. The elements or compounds found, with method of determining.
2. The chemical equations representing the reactions (as far as possible).
3. Your conclusions as to the nature of the samples.
4. What you can determine from a physical examination of the samples.

Every reaction obtained must be shown to the examiner and, if required, explained orally.

Write down a full statement of all breakages during the term's work.

SECOND YEAR.

METEOROLOGY.

Examiner: J. HOYES PANTON, M.A., F.G.S.

1. Account for the barrenness which characterizes the interior of some countries and give examples.

2. Explain what is meant by the dewpoint, and show the value of its determination to the horticulturist. How is it determined?

3. Explain the influence of forests on climate.

4. How do you explain the more common occurrence of summer frosts in newly settled countries than in older?

5. Give the mean of the following readings of a thermometer: 28°,—16°,—54°, 36°, and reduce—42 C. to F., and 40 F. to C.

6. What is meant by the specific heat of water? Show its practical bearing on the climate in some localities in Ontario?

7. What is meant by terrestrial radiation? State conditions which affect it.

8. Name the conditions likely to affect the rainfall of a locality.

SECOND YEAR.

SYSTEMATIC AND ECONOMIC BOTANY.

Examiner: J. HOYES PANTON, M.A., F.G.S.

1. Show in what respects an artificial classification surpasses a natural.

2. Distinguish between a fungus and a grass. Outline the life-history of *Sphæria Morbaca.*

3. Classify the following plants, stating the order to which they belong: Penny grass, blueweed, purslane, trillium, fruge tree, deutzia, waterlily, chickweed, turnip, spruce, bindweed, amaranth, rust, liverwort, lettuce.

4. Give the characters of the orders: *Leguminoseæ, solicaceæ, labiatæ,* and give three examples in each order.

5. Name the economic plants found in the orders: *Cruciferæ, cupuliferæ,* and *gramineæ.*

MIDSUMMER EXAMINATIONS, 1887.—Continued.

6. State the peculiarities observed in the flowers of the orders: *Compositæ* and *cucurbitaceæ.*

7. Identify the weed seeds in the samples of wheat before you.

8. Analyze the plant before you according to the accompanying schedule.

SECOND YEAR.

PRACTICAL HORTICULTURE.

Examiner—J. Hoyes Panton, M.A., F.G.S.

1. Name what you consider the ten best shrubs for ornamental purposes, referring to their size, hardiness, and time of flowering.

2. Describe fully the pruning of a raspberry bush, and compare the pruning of the red currant with that of the black currant.

3. Give some points to be observed in planting flowers in a garden.

4. Describe the most economical way to lay out a vegetable garden.

5. Distinguish the germander-leaved spiræa from the elm-leaved, and give the character of the flowering shrubs found in the order *leguminosæ.*

6. Identify the plants before you.

7. For what purpose is a *cold-frame* used and how made? Give the general characters of soil used in potting.

SECOND YEAR.

VETERINARY OBSTETRICS AND BREEDS OF HORSES.

Examiner : F. C. Grenside, V.S.

1. Describe the placenta, and compare that of solipeds with that of ruminants.

2. Mention the most reliable signs of pregnancy and give the average period of gestation in the different domesticated animals.

3. Describe how parturition is brought about, and give the time occupied in the act by the mare, the cow and the ewe.

4. Describe how the attendant should act during the course of parturition, and state what should be found as representing a normal state on a manual examination.

5. Explain how to effect delivery in the following cases, viz. when all four legs are presented, when head and four legs, when one foreleg is completely retained.

6. Describe how to eviscerate a fœtus in case of breech presentation.

7. Explain how to treat a case of everted uterus.

8. Give the nature and symptoms of parturient apoplexy.

9. Give the strong points of the Clyde and Shire in each case. Give the characteristics of the Suffolk Punch.

10. Give a definition of the term "quality," as applied to horses, and an opinion as to the most suitable class of mares to which to breed Cleveland Bays and Thoroughbreds respectively, in order to produce good carriage horses.

MIDSUMMER EXAMINATIONS, 1887.—Continued.

SECOND YEAR.

ENGLISH LITERATURE.

Examiner: S. C. Smoke, B.A.

Milton's "L'Allegro" and "Il Penseroso."

1. "Hence loathed melancholy,
Of Cerberus, and blackest midnight born,
In Stygian cave forlorn,
'Mongst horrid shapes, and shrieks, and sights unholy;
Find out some uncouth cell,
Where brooding darkness spreads his jealous wings,
And the night-raven sings:
There under ebon shades and low-brow'd rocks,
As ragged as thy locks,
In dark Cimmerian desert ever dwell."

(*a*) Scan the first four lines.

(*b*) Write explanatory notes on *Cerberus, Stygian, Cimmerian.*

(*c*) What figures are employed in the fourth and sixth lines?

(*d*) Express the thought of the passage in your own words.

(*e*) Explain the meaning of *uncouth, brooding, jealous.*

(*f*) Quote the corresponding passage from Il Penseroso, and compare the passages (*a*) as to thought (*b*) as to the construction.

2. "Bright eyes rain influence." Explain the meaning and point out the figure employed.

3. Quote the passages in which occur the following expressions: *Immortal verse, mute silence, fleecy clouds, prophetic strain.*

4. "And when the sun begins to fling
His flaring beams, me goddess bring
To arched walks of twilight groves,
And shadows brown that Sylvian loves;
Of pine or monumental oak,
Where the rude axe with heaved stroke
Was never heard the nymphs to daunt,
Or fright them from their hallowed haunt.
There in close covert by some brook
Where no profaner eye may look,
Hide me from day's garish eye."

(*a*) If you had come across this extract, not knowing its source or its connection, state how you could determine its right to rank as poetry.

(*b*) What is the force of *flaring, twilight, monumental, garish.*

5. Quote your favourite passage, and state wherein you think the beauty consists.

6. With which of these poems was Milton himself more in sympathy? Give reasons for your answer.

MIDSUMMER EXAMINATIONS, 1887.—Concluded.

SECOND YEAR.

ROAD-MAKING, LEVELLING AND SURVEYING.

Examiner: E. Lawrence Hunt.

1. Write fully and minutely on the drainage of roads.

2. Give full directions for the construction of gravel roads.

3. Find the power required to draw a wheel over a stone five inches high, when the diameter of the wheel is $4\frac{1}{2}$ ft., and the total weight 800 lbs., the line of draught horizontal.

4. Determine by the resolution of forces the power required to draw a load of 3500 lbs. up a slope of 1 in 25 when the force on the level is 150 lbs.

5. Complete the following table, indicate the highest and lowest points in the line, and between which two stations the grade is steepest; draw a sketch of the line.

Stations.	Distances.	Back-Sights.	Fore-Sights.	Ascents.	Descents.	Total Heights.
A						
B	120	5.20	2.00			
C	130	4.75	3.20			
D	80	1.70	4.85			
E	180	2.65	6.37			
F	150	7.14	1.55			
G	50	1.25	5.45			

6. Draw a plan of the field (scale 1 inch to the chain) and find the area from the following measurement.

Left Offsets.	Chain Line.	Right Offsets.
	500 to O	
60	425	
125	300	
75	100	
	From O_2 turn to the right.	
	675 to O_2	
230	525	
	275	
175	150	300 to O_3
	From O_2	

APPENDIX 4.

CLASS LISTS:

I.—EASTER EXAMINATIONS, 887.
II.—MIDSUMMER EXAMINATIONS, 1887.

I.—EASTER EXAMINATIONS, 1887.

FIRST YEAR.

Classes.	Live Stock. (Cattle.)	Live Stock. (Sheep.)	Live Stock. (Pigs and Sheep.)	Dairying.	Judging Cattle. (Oral. Exam.)
I.	1 Harcourt, G. 2 Dean, H. H. 2 Mckenzie, A. G. 2 Nelles, S. W. 5 Soule, R. M. 6 Sinclair, J. J. 7 Robson, J. W. 8 Palmer, W. J. 8 Rayden, J. S. 8 Bayne, S. R.	1 Harcourt. 1 Robson. 1 McKenzie. 4 Dean. 5 Soule.	1 Robson. 2 Harcourt. 3 Dean. 3 Shantz.	1 Robson. 2 Harrison. 3 Harcourt. 4 McKenzie. 5 Rayden. 6 Bayne. 6 Elton, C. W. 8 Thompson. 9 Stewart, R. 9 Elton, R. F. 11 de Mauritz. 12 Palmer. 13 Dean. 14 Nelles. 15 Rowen.	1 Harcourt.
II.	1 Thompson, T. F. 2 Carlaw, G. 3 Wilmot, A. B. 4 Sweet, H. R. 4 Willians, T. B. 6 Shantz, A. 6 Scott, J. A. 6 Harrison, R. S. 6 Stewart, J. B. 10 Brown, S. P. 11 Steacy, M. W.	1 Nelles. 2 Brown. 2 Palmer. 2 Willans, T. B. 2 Sinclair. 2 Shirreffs. 7 Scott. 7 Harrison. 7 Rayden. 7 Cleugh. 7 Hoacock. 7 Thompson. 13 Bayne. 13 Carpenter. 13 Shantz. 13 Somerville.	1 Rowen. 2 Brown. 3 Harrison. 4 Carlaw. 5 Rayden. 5 Austin. 5 Palmer. 8 Serson. 8 Boyd. 10 Vallance. 10 Nelles. 12 VanLuven. 12 Bayne. 12 Scott. 12 Cleugh. 12 Morrison. 12 Steacy. 12 Shirreffs. 12 Soule. 12 Heacock.	1 Shantz. 1 Willans, T. B. 3 Price. 3 Sinclair. 5 Horrocks. 5 Denison. 7 Shirreffs. 8 Wilmot. 9 Soule. 10 Brown. 10 Scott. 12 Budd. 13 Esplen. 13 Steacy. 15 Willans, N. 15 Gardiner. 17 Heacock. 18 Cleugh.	1 McKenzie. 2 Robson. 3 Nelles. 4 Budd. 4 Dean. 6 Shantz. 6 Sweet. 8 Cleugh. 9 Sinclair. 10 Palmer. 10 Serson. 10 Brown. 10 Thompson. 14 Stewart, R. 15 Rayden. 15 Rowen. 17 Harrison. 17 Heacock. 17 Steacy. 17 Somerville. 17 Soule. 17 Valance. 17 Elton, R. F. 17 Denison. 17 Carlaw. 17 Bayne.

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

FIRST YEAR.

CLASSES.	LIVE STOCK. (Cattle.)	LIVE STOCK. (Sheep.)	LIVE STOCK. (Sheep and Pigs.)	DAIRYING.	JUDGING CATTLE. (Oral Exam.
PASS. III.	1 Heacock, F. W. Shirreffs, G. G. 3 Somerville, J. R. 4 Serson, W. E. Cleugh, H. H. Budd, W. Carpenter, W. S Rowen, M. B. 9 Elton, R. F. Stewart, R. 11 Esplen, J. H. Boyd, W. C. 13 Austin, A. M. 14 Mutton, F. A. 15 Denison, D. 16 Morrison, W. S. 17 de Mauritz, R. C. Drysdale, W. P Horrocks, T. J. 18 Willans, N. Valance, R. Sullivan, R. 23 VanLuven, R. M. 24 Globensky, E. A Gardiner, R. J. Routhier, J. A. Price, V. Stubbs, H. C.	1 de Mauritz. 2 Sweet. Stewart, J. B. 4 Austin. Budd. Mutton. 5 Boyd. Rowen. Elton, R. F. Stewart, R. 11 Horrocks. 12 Willans, N. 13 Drysdale. Morrison. 15 Carlaw. 16 Esplen. Wilmot. Steacy. 19 Serson. Globensky. 21 Denison. Valance. Price. Routhier. Sullivan. Stubbs. Gardiner. VanLuven.	1 Somerville. 2 Horrocks. 3 Carpenter. Wilmot. 5 Denison. 6 Budd. 7 Willans, T. B. 8 McKenzie. Stewart, R. 10 Thompson. 11 Elton, R. F. 12 Sinclair. Esplen. 14 Willans, N. 15 Stewart, J. B Drysdale. 17 Sweet. 18 Sullivan. 19 de Mauritz. 20 Price. 21 Globensky. Routhier. Stubbs. Mutton. Gardiner.	1 VanLuven. Morrison. Austin. Mutton. 5 Sweet. 6 Valance. 7 Carpenter. 8 Boyd. 9 Serson. Carlaw. 11 Globensky. 12 Somerville. 13 Sullivan. 14 Stubbs. 15 Routhier. Stewart, J. B. 17 Drysdale.	1 Scott. Price. 3 Esplen. VanLuven. Willans, T. B Austin. Stewart, J. B. 6 de Mauritz. Morrison. Shirreffs. Sullivan. 12 Carpenter. Horrocks. Willans, N. 13 Wilmot. Stubbs. Boyd. 18 Drysdale. 19 Mutton. 20 Globensky. 21 Routhier. Gardiner.

Names unnumbered are those of students who failed to pass in the subject.

The minimum for first-class honours is 75 per cent.; for second-class honours, 60 per cent.; for pass, 3 per cent.

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

FIRST YEAR.

HONOURS.

Classes.	Judging Sheep. (Oral Exam.)	Inorganic Chemistry.	Organic Chemistry.	Natural History.	English Literature.
I.	1 Sweet. 2 Robson. 2 Harcourt. 2 Nelles.	1 Harcourt. 2 Rayden. 3 Stewart, R. 4 Robson. 5 Harrison. 6 Rowen. 8 Soule. 7 Austin. 9 Palmer.	1 Rayden. 2 Harcourt. 3 Dean. 4 Harrison. 5 Shirreffs. 6 Robson. 6 McKenzie. 8 Palmer. 8 Elton, R. F.	1 Harcourt. 2 Robson. 3 Harrison. 4 McKenzie. 5 Dean.	1 Harcourt. 2 Robson. 3 Willans, T. B. 4 Dean. 5 Soule. 6 Harrison. 7 Shantz. 8 McKenzie. .....
II.	1 Soule. 1 Thompson. 3 Somerville. 4 de Mauritz. 5 Sinclair. 5 Rowen. 7 Rayden. 7 Palmer. 7 Brown. 10 Shirreffs. 11 Esplen. 11 Willans, T. B. 11 Van Lusen. 11 Stewart, R. 15 Shantz. 15 Scott. 15 Harrison. 18 Dean. 19 Price. 19 McKenzie. 19 Mutton. 19 Cleugh. 19 Carlaw.	1 Bayne. 2 Shantz. 3 Dean. 4 McKenzie.	1 Willans, T. B. 2 Shantz. 3 Bayne. 4 Soule. 5 Austin. 6. de Mauritz. 7 Morrison. 8 Sweet.	1 Palmer. 2 Rayden. 3 Soule. 4 Bayne. 5 Shantz. 5 Willans, T. B. 7 Austin. 8 de Mauritz. 8 Elton, R. F. 10 Carpenter. 11 Willans, N.	1 Price. 2 Wilmot. 3 de Mauritz. 3 Bayne. 5 Austin. 5 Stewart, R. 7 Palmer. 8 Elton, R. F. 9 Sinclair. 10 Rayden. 11 Rowen. ....

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

FIRST YEAR.

CLASSES.	JUDGING SHEEP. (Oral Exam.)	INORGANIC CHEMISTRY.	ORGANIC CHEMISTRY.	NATURAL HISTORY.	ENGLISH LITERATURE.
PASS. III.	1 Horrocks. 1 Wilmot. 1 Willans, N. 1 Stewart, J. B. 5 Bayne. 5 Budd. 7 Denison. 7 Valance. 7 Elton, R. F. 10 Serson. 10 Heacock. 10 Carpenter. 13 Austin. 13 Boyd. . 15 Steacy. 15 Stubbs. 17 Gardiner. 18 Morrison. 19 Globensky. 20 Drysdale. 21 Routhier. 21 Sullivan. ....

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

FIRST YEAR.

Classes.	Veterinary Anatomy.	Arithmetic.	Book-keeping.	General Proficiency.
HONOURS. I.	1 Harcourt. 2 Robson. 3 Brown. 3 Shantz. 5 Bayne. 6 Dean.	1 Harcourt. 2 Stewart, R. 3 McKenzie. 3 Sinclair. 5 Shantz.	1 Shantz. 2 Stewart. 3 Harcourt. 4 Robson. 5 Dean. 5 Van Luven. 7 Carlaw. 8 McKenzie. 9 Brown. 10 Soule. 11 Shirreffs.	1 Harcourt. 2 Robson. 3 McKenzie. 4 Dean.
HONOURS. II.	1 Rowen. 1 Harrison. 3 Elton, R. F. 4 McKenzie. 5 Soule. 6 Steacy.	1 Shirreffs. 2 de Mauritz. 3 Rayden. 4 Rowen. 5 Dean. 6 Van Luven. 7 Robson. 7 Austin. 7 Serson. 7 Budd. 11 Cleugh. 11 Thompson. 11 Harrison.	1 Rowen. 2 Palmer. 3 Morrison. 4 Serson. 5 Sinclair. 6 Rayden. 7 Austin.	1 Shantz. 2 Harrison. 3 Soule. 4 Rayden. 5. Bayne. 6 Palmer. 7 Stewart, R. 8 Rowen. 9 Sinclair. 10 Brown. 11 Shirreffs.
PASS. III.	1 Esplen. 2 Palmer. 3 Shirreffs. 4 Sinclair. 5 Thompson. 6 Nelles. 7 Stewart, R. 8 Serson. 8 Rayden. 10 Cleugh. 11 Willans, T. B. 11 Morrison. 13 Valance. 13 Sweet. 15 Carpenter. 15 Budd. 17 Austin. 18 Carlaw. 18 Heacock. 20 Denison. 20 Horrocks. 20 de Mauritz. Somerville. Willans, N. Wilmot. Stott. Routhier. Boyd. Drysdale. Stewart, J. B. Sullivan. Gardner. Van Luven. Price. Stubbs. Mutton. Globensky.	1 Bayne. 2 Heacock. 3 Esplen. 4 Brown. 5 Steacy. 6 Soule. 7 Nelles. 8 Denison. 9 Carlaw. 9 Palmer. 9 Horrocks. 9 Price. 13 Wilmot. 14 Gardiner. 15 Carpenter. 16 Elton, R. F. 17 Sweet. 18 Scott. 19 Morrison. 19 Globensky. 19 Stewart, J. B. 19 Sullivan. 19 Valance. 19 Somerville. 19 Willans, T. B. Boyd. Willans, N. Drysdale. Mutton. Stubbs. Routhier.	1 Horrocks. 2 Heacock. 3 Bayne. 4 Budd. 5 Steacy. 6 Valance. 7 Somerville. 8 Harrison. 9 Sweet. 10 Willans, T. B. 11 Price. 11 Nelles. 13 Mutton. 14 Thompson. 15 Denison. 16 Cleugh. 17 Esplen. 18 Elton, R. F. 18 Scott. 20 de Mauritz. 20 Carpenter. 20 Wilmot. Boyd. Willans, N. Stewart, J. B. Drysdale. Routhier. Sullivan. Stubbs. Globensky. Gardiner.	1 Willans, T. B. 1 Austin. 3 Elton, R. F. 4 Nelles. 5 Thompson. 6 Steacy. 7 de Mauritz. 8 Serson. 9 Heacock. 10 Esplen. 11 Morrison. 12 Carlaw. 13 Sweet. 14 Carpenter.

☞Names unnumbered are those of students who failed to pass in the subject.
The minimum for first-class honours is 75 per cent.; for second-class honours is 60 per cent.; for pass, er cent.

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

SECOND YEAR.

Classes.	Agriculture.	Live Stock.	Live Stock. (Pigs and Sheep).	Dairying.	Agriculture.
HONOURS. I.	1 Morgan, H. A. 2 Scrugham, J. G. 3 Sleightholm, F. J. 4 Lick, E. 5 Craig, J. A. / McCallum, E. G. / Hart, J. W.	1 Sleightholm. 2 Scrugham. 3 Lick. / Hart, J. W. 5 Creelman.	1 Hart, J. W. 2 Lick. 3 Sleightholm. 4 Craig. 5 Morgan. / Hart, J. A. 7 Donald. 8 Scrugham. 9 Gilbert.	1 Lick. 2 Scrugham. 3 Morgan. 4 Hart, J. W. / Sleightholm. 6 Craig. / Ewing. 8 Howes. / Donaldson.	1 Sleightholm. .....
II.	1 Donald, J. C. / Creelman, G. C. 3 Howes, J. S. / Gilbert, W. J. 5 Donaldson, F. N. / Harkness, A. D. 7 Leavens, D. H. / Ewing, W. 9 Hart, J. A. / Paterson, B. E. / Orsman, C. P.	1 McCallum. / Morgan. 3 Craig. / Paterson. / Gilbert. 6 Leavens. / Howes. 8 Donaldson. / Ewing. 10 Donald.	1 Leavens. 2 Ewing. 3 McCallum. 4 Creelman. 5 Howes. 6 Paterson. / Donaldson.	1 Orsman. / Acres. 3 McCallum. 4 Hart, J. A. 5 Paterson. 6 Leavens. 7 Harkness. 8 Donald. / Livesey. 10 Gilbert.	1 Craig. 2 Scrugham. / Lick, 4 McCallum. / Hart, J. A. 6 Creelman. / Morgan. 8 Ewing. / Howes. 10 Paterson. / Donaldson. / Donald.
PASS. III.	1 Livesey, E. M.	1 Hart, J. A. 2 Orsman. 3 Harkness. / Livesey.	1 Livesey. 2 Harkness. 3 Orsman.	Creelman. Ritchie.	Gilbert. Leavens. Harkness. Livesey. Hart, J. A. Orsman.

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CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

SECOND YEAR.

CLASSES.	JUDGING CATTLE. (Oral Exam.)	JUDGING SHEEP. (Oral Exam.)	AGRICULTURAL CHEMISTRY.	ENTOMOLOGY.	VETERINARY PATHOLOGY.
HONOURS. I.	1 Scrugham. 1 Sleightholm. 3 Creelman.	1 Scrugham. 2 Sleightholm. 3 Lick. 3 Hart, J. A. 3 Morgan.	1 Scrugham. 2 Lick. 3 Sleightholm. 4 Hart, J. W. 5 Craig. 6 Morgan.	Scrugham. Sleightholm. Lick. Hart, J. W. McCallum.	Scrugham. Sleightholm. Lick. Hart, J. W.
HONOURS. II.	1 Gilbert. 1 Craig. 3 Hart, J. A. 3 Ewing. 3 Donald. 6 Morgan. 6 Lick. 8 Hart, J. W. 9 Paterson. 9 McCallum. 9 Leavens. 9 Howes. 9 Donaldson. 14 Orsman.	1 Hart, J. W. 2 Ewing. 3 Donald. 3 Gilbert. 3 McCallum. 6 Creelman. 7 Orsman. 8 Craig. 8 Paterson. 8 Donaldson.	1 Donaldson. 2 McCallum. 3 Ewing.	1 Ewing. 2 Morgan. 3 Craig. 4 Donaldson. 5 Paterson. 6 Livesey. 7 Sharman. 8 Donald. 9 Creelman.	Paterson. McCallum. Hart, J. A. Morgan.
PASS. III.	1 Livesey. 1 Harkness.	1 Leavens. 2 Harkness. 3 Howes. 3 Livesey.	1 Paterson. 2 Sharman. 3 Hart, J. A. 4 Orsman. 5 Donald. 6 Howes. 7 Creelman. 8 Gilbert. 9 Harkness. 10 Livesey. 11 Leavens.	1 Harkness. 2 Leavens. 3 Howes. 4 Gilbert. 5 Hart, J. A. 6 Orsman.	1 Leavens. 2 Craig. 3 Donaldson. 4 Gilbert. 5 Ewing. 6 Harkness. 7 Howes. 7 Livesey. 9 Orsman. 9 Creelman. 11 Donald.

Names unnumbered are those of students who failed to pass in the subject.

The minimum for first-class honours is 75 per cent. ; for second-class honours, 60 per cent. ; for pass, 33 per cent.

CLASS LISTS (EASTER EXAMINATIONS)—*Continued.*

SECOND YEAR.

Classes.	Practical Horse.	English Literature.	Political Economy.	Mechanics.	General Proficiency.
HONOURS. I.	1 Scrugham. 2 Lick. 3 McCallum. 4 Sleightholm. 5 Gilbert.	1 Sleightholm. 2 Lick. 3 Donaldson.	1 Scrugham. 2 Hart, J. W. 3 Lick. 4 Creelman. 5 Donald. 6 Paterson. 7 Donaldson. 8 Sleightholm.	1 Lick.	1 Scrugham. 2 Sleightholm. 3 Lick. 4 Hart, J. W.
HONOURS. II.	1 Morgan. 2 Craig. 3 Donaldson. 4 Hart, J. W. 5 Creelman. 6 Ewing. 7 Hart, J. A.	1 Scrugham. 2 Hart, J. W. 3 Sharman.	1 McCallum. 2 Gilbert. 3 Morgan. 4 Ewing. 5 Sharman. 6 Orsman. 7 Howes. 8 Harkness.	1 Gilbert. 2 Sleightholm. 3 Scrugham. 4 Hart, J. W. 5 { Harkness. { Hart, J. A. 7 Orsman.	Morgan. McCallum. Craig. Donaldson. Ewing. Gilbert.
PASS. III.	1 Livesey. 2 Paterson. 3 { Howes. { Leavens. 5 Harkness. 6 Orsman. 7 Donald.	1 Morgan. 2 Creelman. 3 Gilbert. 4 Howes, 5 { Ewing. { McCallum. 7 Donald. 8 Craig. 9 Livesey. 10 Paterson. 11 Hart, J. A. 12 Orsman. 13 Harkness. Leavens.	1 Hart, J A. 2 Craig. 3 Leavens. 4 Livesey.	1 Ewing, 2 McCallum. 3 Donaldson. 4 Craig. 5 { Howes. { Livesey. 7 Paterson. 8 Creelman. 9 { Morgan. { Sharman. 11 Leavens. Donald.	1 Creelman. 2 Paterson. 3 Hart, J. A. 4 Howes. 5 Orsman. 6 Harkness. 7 Livesey.

Only those who pass in every subject are ranked in General Proficiency.

First-class men in General Proficiency must obtain at least 75 per cent. of the total number of marks second-class men, at least 60 per cent. of the total number of marks.

CLASS LISTS.

II.—MIDSUMMER EXAMINATIONS, 1887.

FIRST YEAR.

Classes.		Agriculture.	Geology.	Botany.	Veterinary Materia Medica.	English Grammar.
Honours.	I.	1 Harcourt, G. Robson, J. W. 3 Dean, H. H. 4 McKenzie, A. G. 5 Soule, R. M. Rayden, J. S. 7 Carlaw, G. 8 Brown, S. P. Nelles, S. W.	1 Robson. 2 Rayden. 3 Harcourt. 4 McKenzie. 5 Soule. Dean.	1 Jackson. 2 Harcourt. 3 McKenzie. Robson.	1 Robson. 2 Harcourt. 3 McKenzie. 4 Dean.	1 Robson. 2 McKenzie. Jackson. 4 Harcourt. 5 Dean. 6 Shantz. 7 Rowen.
	II.	1 Carpenter, W. S. 2 Palmer, W. G. 3 Esplen, J. H. 4 Thompson, T. F. Sinclair, J. J. Shantz, A. 7 Budd, W. 8 Jackson, F. A. Morrison, W. S. 10 Heacock, F. W. 11 Austin, A. M. Shirreffs, G. G. 13 Serson, W. E. Cleugh, H. H. 15 Valance, R. Knowlton, S. M. Sweet, H. B. Rowen, M. B.	1 Jackson. 2 Shantz. 3 Shirreffs. 4 Austin. 5 Thompson. 6 Marsack, H. Knowlton. 8 Willans, T. B. 9 Cleugh. 10 Palmer. 11 Brown. Rowen. 13 Elton, R. F. Stewart, R. 15 Sweet.	1 Soule. 2 Shantz. Brown. 4 Dean. 5 Elton, R. F. 6 Palmer. 7 Rowell. 8 Shirreffs.	1 Soule. 2 Shantz. 3 Jackson. 4 Esplen. 5 Palmer.	1 Stewart, R. 2 Soule. 3 Marsack, H. 4 Willans, T. B. 5 Shirreffs. 6 Brown. Nelles. 8 Thompson. 9 Steacy. 10 Sinclair. Sweet. 12 Willans, N.
Pass.	III.	1 Stewart, R. 2 Campbell, W. Willans, T. B. 4 Steacy, M. W. 5 Somerville, A. R. Stewart, J. B. Boyd, W. C. 8 Horrocks, T. J. 9 Willans, N. 10 Elton, R. F. 11 Marsack, H. 12 Goblensky, C. A. Drysdale, W. P. Mutton, F. A. 15 Wilmot, A. B. 16 Marsack, F.	1 Somerville. 2 Esplen. 3 Steacy. 4 Carpenter. 5 Marsack, F. Budd. 7 Carlaw. 8 Serson. 9 Nelles. 10 Sinclair. 11 Willans, N. 12 Heacock. 13 Horrocks. 14 Morrison. 15 Wilmot. 16 Mutton. 17 Campbell. 18 Valance. Stewart, J. B. Drysdale. Globensky. Boyd.	1 Esplen. 2 Steacy. Rayden. 4 Knowlton. Sweet. 6 Thompson. Austin. 8 Morrison. 9 Nelles. Willans, T. B. 11 Marsack, H. 12 Carpenter. 13 Stewart, R. 14 Sinclair. Marsack, F. Budd. 17 Willans, N. 18 Serson. 19 Valance. 20 Wilmot. 21 Heacock. Cleugh. 23 Carlaw. Mutton. Boyd. Campbell. Drysdale. Horrocks. Somerville. Stewart, J. B. Globensky.	1 Rayden. 2 Willans, T. B. Elton. Sweet. 5 Stewart, R. 6 Nelles. Marsack, H. 8 Heacock. Steacy. 10 Shirreffs. 11 Austin. Rowen. 13 Willans, N. 14 Cleugh. Serson. Brown. 17 Wilmot. Carpenter. 19 Budd. 20 Somerville. 21 Sinclair. Knowlton. Drysdale. Horrocks. 23 Marsack, F. Valance. Morrison. Carlaw. Boyd. Thompson. Mutton. Campbell. Globensky. Stewart, J. B.	1 Rayden. 2 Horrocks. 3 Knowlton. 4 Morrison. 5 Esplen. 6 Elton. 7 Wilmot. 8 Somerville. 9 Valance. 10 Marsack, F. 11 Serson. 12 Budd. 13 Palmer. 14 Carpenter. 15 Mutton. 16 Heacock. 17 Carlaw. Cleugh. Austin. Globensky. Drysdale. Campbell. Boyd. Stewart, J. B.

Names unnumbered are those of students who failed to pass in the subject.

The minimum for first-class honours is 75 per cent.; for second class honours, 60 per cent.; for pass, 33 per cent.

CLASS LISTS (MIDSUMMER EXAMINATIONS).—*Continued.*

FIRST YEAR.

Classes.	English Composition.	Mensuration.	General Proficiency.	Depart-ments.		Men ranked First-Class on the total work of the year.
HONOURS. I.	1 Dean. 2 Robson. 3 Harcourt.	1 Stewart, R. 2 Jackson. 3 Dean. 4 Thompson.	1 Robson. 2 Harcourt. 3 Dean. 4 McKenzie.	I.	Agriculture and Live Stock.	1 Harcourt. 2 Robson. 3 Dean. 4 McKenzie.
HONOURS. II.	1 McKenzie. 2 Willans, T. B. 3 Rowen. 4 Stewart, R.	1 Shantz. 2 Sinclair. 3 Shirreffs. 4 Harcourt. 5 McKenzie. 6 Soule. 7 Rowen.	1 Jackson. 2 Shantz. 3 Soule. 4 Stewart, R. 5 Rowen.	II.	Natural Science.	1 Harcourt. 2 Robson. 3 Rayden. 4 McKenzie.
PASS. III.	1 Morrison. 2 Serson. 3 Jackson. 4 Rayden. 5 Sinclair. 6 Shirreffs. 7 Thompson. 8 Brown. 9 Marsack, H. 10 Shantz. 11 Willans, N. 12 Budd. / Wilmot. 14 Soule. 15 Knowlton. / Sweet. 17 Steacy. / Austin. / Palmer. / Carlaw. Nelles. / Cleugh. / Valance. / 21 Esplen. / Horrocks. / Somerville. / Marsack, F. / Heacock. Elton, R. F. Mutton. Carpenter. Campbell. Drysdale. Stewart, J. B. Boyd. Globensky.	1 Carlaw. 2 Robson. 3 Knowlton. 4 Elton. 5 Steacy. / Palmer. 7 Brown. 8 Esplen. 9 Budd. 10 Rayden. 11 Morrison. 12 Wilmot. 13 Cleugh. / Heacock. / Somerville. / Sweet. 17 Nelles. / Serson. / Horrocks. / Marsack, F. / Campbell. / Valance.	1 Shirreffs. 2 Rayden. 3 Brown. 4 Palmer. 5 Sinclair. 6 Esplen. 7 Sweet. 8 Nelles. 9 Knowlton. 10 Steacy. 11 Morrison. 12 Serson. 13 Budd. 14 Heacock. 15 Valance. 16 Wilmot. / Marsack, F.	III.	Veterinary Science.	1 Harcourt. 2 Robson. 3 McKenzie. 4 Shantz. 5 Dean.
				IV.	English Literature.	1 Robson. 2 Dean. 3 Harcourt. 4 McKenzie.
				V.	Mathematics and Book-keeping.	1 Stewart, R. 2 Harcourt. 3 McKenzie. 4 Sinclair. 5 Shantz.

Names unnumbered are those of students who failed to pass in the subject.

Only those who pass in every subject are ranked in General Proficiency.

First-class men in General Proficiency must obtain at least 75 per cent. of the total number of marks; second class men, at least 60 per cent. of the total number of marks.

First-class men in any department must obtain at least 75 per cent. of the marks allotted to the subjects in that department.

CLASS LISTS (MIDSUMMER EXAMINATIONS)—*Continued.*

SECOND YEAR.

Classes.		Agriculture.	Analytical Chemistry.	Meteorology.	Systematic and Economic Botany.	Practical Horticulture.
HONOURS.	I.	1 Sleightholm F. J. and Scrugham, J. G. 3 Lick, E. 4 Craig, J. A. 5 Morgan, H. A. 6 McCallum, E. G. 7 Hart, J. W. and Creelman, G. C. 9 Ewing, W.	1 Lick. 2 Sleightholm. 3 Scrugham. 4 Hart, J. W.	1 Scrugham. 2 Elton. 3 Sleightholm. 4 Lick. 5 Hart, J. W. 6 McCallum. 7 Sharman.	1 Scrugham. 2 Sleightholm. 3 Craig. 4 Lick. 5 Hart, J. W. 6 Ewing.	Lick. Sleightholm. Scrugham. Hart, J. W. Morgan. Sharman. Craig.
	II.	1 Paterson, B. E. and Howes, J. S. and Leavens, D. H. 4 Bayne, S. R. 5 Donald, J. C. 6 Gilbert, W. J. and Scott, J. A. 8 Hart, J. A. and Harkness, A. D. 10 Orsman, C. P. 11 Elton, C. W. and Livesey, E. M.		1 Morgan. and Craig. 3 Donaldson. 4 Bayne. and Gilbert. 6 Creelman. 7 Livesey. 8 Ewing. 9 Howes. 10 Harkness.	1 McCallum. 2 Elton, C. W. 3 Morgan. 4 Paterson. 5 Gilbert. 6 Howes. 7 Creelman. 8 Sharman.	McCallum. Creelman. Ewing. Elton. Howes. Livesey. Hart, J. A. Paterson. Donaldson. Bayne.
PASS.	III.	1 Price, V. 2 Donaldson, F. N. 3 de Mauritz, R. C.	1 Sharman. 2 Elton. 3 Morgan. 4 Craig. 5 Orsman. 6 Howes. 7 Donaldson. 8 Livesey. 9 Ewing. 10 McCallum. 11 Gilbert. 12 Paterson. 13 Donald. 14 Creelman. 15 Harkness. 16 Bayne. 17 Leavens. 18 Hart, J. A. Price. Scott. de Mauritz.	1 Paterson. 2 Hart, J. A. 3 Donald. 4 Orsman. 5 Scott. 6 Leavens. 7 Price. 8 de Mauritz.	1 Donaldson. 2 Bayne. 3 Hart, J. A. 4 Orsman. 5 Leavens. 6 Harkness. 7 Donald. 8 Livesey. 9 Price. Scott. de Mauritz.	1 Donald. 2 Gilbert. and Leavens. 4 Price. 5 Harkness. 6 Scott. 7 Orsman. de Mauritz.

Names unnumbered are those of students who failed to pass in the subject.

CLASS LISTS (MIDSUMMER EXAMINATIONS)—*Continued.*

SECOND YEAR.

Classes.	Veterinary Obstetrics and Breeds of Horses	English Literature.	Road-making.	General Proficiency.	Department.	Men ranked First-Class on the total work of the year.
HONOURS. I.	1 Scrugham. 2 Sleightholm. 3 Lick.	1 Sleightholm. 2 Scrugham. 3 Sharman. 4 Elton, C.W. / Lick. / Gilbert. 7 Donaldson. 8 Donald.	1 Lick. 2 Sleightholm / Scrugham. 4 Bayne. 5 Elton, C. W. 6 Howes. 7 Harkness. 8 Hart, J. W. / Ewing.	1 Scrugham. 2 Sleightholm. 3 Lick. 4 Hart, J. W.	I. Agriculture and Live Stock.	1 Sleightholm. 2 Scrugham. 3 Lick. 4 Morgan. 5 Hart, J. W. 6 Craig.
II.	1 Hart, J. W. 2 Elton, C. W. 3 Donaldson. 4 Ewing.	1 Creelman. 2 Craig. / Ewing. / Hart, J. W. 5 Morgan. 6 Paterson.	1 McCallum. 2 Gilbert. / Craig. 4 Morgan. 5 Sharman. 6 Hart, J. A. 7 Orsman. / Donald.	1 Craig. 2 Elton, C. W. 3 Morgan. 4 Ewing. 5 McCallum. 6 Howes. 7 Gilbert.	II. Natural Science.	1 Scrugham. 2 Lick. 3 Sleightholm 4 Hart, J. W. 5 Craig.
					III. Veterinary Science.	1 Scrugham. 2 Sleightholm. 3 Lick. 4 Hart, J. W.
PASS. III.	1 Morgan. / Craig. 3 Livesey. 4 Bayne. 5 Gilbert. / McCallum. 7 Howes. 8 Paterson. 9 Orsman. 10 Leavens. 11 Donald. 12 Harkness. 13 de Mauritz. 14 Creelman. 15 Hart, J. A. 16 Scott. Price.	1 Hart, J. A. / Howes. / McCallum. 4 Price. 5 Leavens. 6 Orsman. 7 de Mauritz 8 Livesey. 9 Harkness. 10 Bayne. Scott.	1 Creelman. 2 Donaldson. 3 Paterson. 4 Leavens. 5 Livesey. 6 Scott. / de Mauritz. Price.	1 Creelman. 2 Paterson. 3 Donaldson. 4 Bayne. 5 Donald. 6 Orsman. 7 Hart, J. A. 8 Livesey. 9 Harkness. 10 Leavens. 11 Sharman.	IV. English Literature and Political Economy.	1 Sleightholm. 2 Scrugham. 3 Hart, J. W. / Lick. 5 Donaldson.
					V. Mathematics and Book-keeping.	Lick. Scrugham. Sleightholm, Hart, J. W.

APPENDIX 5.

COLLEGE IN ACCOUNT WITH FARM AND GARDEN.

(*a*) With Farm.

To 106 bags potatoes, at 90c	$ 95.40
" 3,358 gallons milk, at 12c	402.96
" Cartage for College	20.00
" Feed for College horse (without attendance)	75.00
" Feed for Bursar's horse (without attendance)	75.00
" Carpenter work by students, etc.	15.00
	$683.36

(*b*) With Garden.

To fruit and vegetables (for items and prices, see Mr. Forsyth's Report, Part VI.)	$648.49
Total receipts	$1,331.85
By amounts paid by College Student labour on farm and garden	3,192.05
Balance to credit of College	$1,860.20

PART II.

REPORT OF THE

PROFESSOR OF NATURAL HISTORY AND GEOLOGY.

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, December 31st, 1887.

To the President of the Ontario Agricultural College:

SIR,—In submitting to you a report of the Department of Natural History, it will be convenient to consider it under the following topics:—

1. Museum.
2. Library.
3. Reading-room.
4. Practical work.
5. Lectures.

1. COLLEGE MUSEUM.

In my report of last year, I took occasion to remark upon the propriety of making our museum largely of an instructive nature, and suggested some improvements, which I am glad to say are now being carried on, and will be completed ere long. It is to be hoped that some allowance will be made for the addition of new cases, instead of the somewhat antiquated ones which formerly occupied a great deal of space and showed but few objects.

During the year we have been indebted to the following for important donations to this department:—

1. W. M. Ramsay, Esq., Galt Coal Co. Fragment of coal from Lethbridge, N. W. T.
2. Mr. Elliot, Kingsville. Specimens of corn in the ear.
3. Master Ross, Chatham. 9 cocoons of several species of moths.
4. D. K. Erb, Esq., Sebringville. A living flying-squirrel.
5. S, Harkness, student. Nerves from a horse, and a portion of an artery.
6. D. H. Leavens, student. Specimen illustrating grafting.
7. John Morrison, Jr., Mandaumin. Specimens of wireworms.
8. W. L. Smith, Esq., Manitoulin Island. 3 specimens of coral.
9. E. Newton, Esq., Guelph. Fossils from Utica slate.
10. Prof. James, Agricultural College. Specimens illustrating raindrops and ripple marks upon rocks.
11. T. J. Day, Guelph. Heather and misletoe.
12. W. R. Bishop, student. Fossils from corniferous formation.
13. Messrs. Craig, Sharman, Raynor and Paterson, students. Stalactites and stalagmites from caves at Rockwood, and rounded stones from the potholes near them.
14. Prof. J. Hoyes Panton. Specimens of rock from Giant's Causway, Fingal's Cave, Ben Nevis and Mt. Rigi, in the Alps.
15. G. B. Boyce, Esq., Norham. Foot of a beaver, and a piece of wood gnawed by a beaver.

Our students are showing a greater interest each year in donating specimens to the Museum, and we may reasonably expect some valuable additions as soon as the new Museum is ready.

We shall always be pleased to receive from any one, specimens that will assist in illustrating facts in connection with Agricultural science.

2. Library.

Among other changes in the building during this year, is the enlargement of the Library, which had become too small. At present it is exceedingly convenient and affords excellent facilities for the arrangement of books, and in many respects for the accomodation of advanced students taking a third year course.

It contains 5,274 volumes of which 204 have been added this year. The latter may be grouped as follows :—

Reports, chiefly agricultural	76
Natural History, including Botany	15
Veterinary	1
Agriculture	18
Chemistry	5
Literature	14
Encyclopædias	5
Horticulture	13
Arboriculture	1
Dairying	6
Geology	4
History	11
Entomology	2
Stock	12
General Science	4
Pamphlets	17
	204

Reading-room.

This is one of the most commodious and pleasant rooms in the College, and is becoming yearly more used for the purpose it was intended. It is well furnished for reading and study; excellent tables and chairs, and convenient reading-desks, upon which are found the best agricultural journals published, a list of which is given below.

Rules regarding the proper use of the reading-room are posted in conspicuous places.

It is a pleasure to report that the students take an interest in keeping this room in order, and not turning it into a place for general discussion.

The following is a list of papers, journals and magazines which come to the College, and are for the use of the students in attendance :—

Papers and Magazines.

(a) *Sent free by the Publishers.*

Name.	Where published.
1. Journal of Commerce	Montreal
2. Journal of Agriculture	"
3. Christian Guardian	Toronto.
4. Canada Presbyterian	"
5. Mechanical and Milling News	"
6. Monthly Weather Review	"
7. Presbyterian Review	"
8. Canadian Lumberman	Peterboro'.
9. Manitoba Weekly Free Press	Winnipeg.
10. Canadian Horticulturist	St. Catharines.
11. Canadian Entomologist	London, Ont.
12. Farm and Home	Springfield, Mass.
13. Bee Journal	Beeton.
14. North York Reformer	Newmarket.
15. Acton Free Press	Acton.

(b) *Furnished by the College.*

1.	The Daily Globe	Toronto.
2.	" Mail	"
3.	" Mercury	Guelph.
4.	" Herald	"
5.	Rural Canadian	Toronto.
6.	Grip	"
7.	The Week	"
8.	Farmers' Advocate	London, Ont.
9.	Canadian Dairyman	Montreal.
10.	Canadian Stock-Raisers' Journal	Hamilton.
11.	Nor'-West Farmer	Winnipeg.
12.	Popular Science News	Boston.
13.	Rural New Yorker	New York.
14.	Gardener's Monthly	Philadelphia.
15.	North British Agriculturist	Edinburgh (Scotland).
16.	Farmers' Gazette	Dublin (Ireland).
17.	Mark Lane Express	London (England).
18.	American Garden	Greenfield (Mass.)
19.	American Naturalist	Philadelphia.
20.	Veterinary Journal	London (England).
21.	Veterinarian	"
22.	Cultivator and Country Gentleman	Albany, N. Y.
23.	Scientific American	New York.
24.	" Supplement	"
25.	Live Stock Journal and Fanciers' Gazette	England.
26.	Live Stock Journal	Chicago.
27.	American Agriculturist	New York.
28.	American Dairyman	"
29.	Nature	London (England).
30.	Botanical Gazette	Crawfordsville, Indiana.
31.	Agricultural Science	Geneva, N. Y.
32.	American Bee Journal	Chicago.
33.	Canadian Honey Producer	Brantford.

4. Practical Work.

When opportunity was afforded, my efforts in the line of practical work were employed in collecting data of use in the preparation of bulletins, and in trying to improve facilities for the purpose of rendering instructions in science of a thoroughly practical nature.

During the past year a portion of the garden was selected and set out with plants, representing the most common species, genera and orders discussed in lectures on Botany.

The beds were so arranged that the students could take their note-books to the garden, and there find the plants referred to, labelled and arranged in regular order, as they were discussed in the lecture room.

Thirty-two orders, 150 genera and 250 species were thus arranged, and it is intended to increase the number next year. Visitors were much pleased with this collection of herbaceous plants, for here, on examination, they found some beautiful flowers associated with some much less attractive. The cabbage and mustard grew side by side, the heliotrope and the detested burr, and other striking examples of plants related in structure, though widely separated in form. Students found this a great aid in the study of Botany.

During the year the following bulletins have been prepared on Apples, Weeds, and the Crane Fly.

Weeds.

At a period in Canadian farming when much interchange of seed is taking place, I have thought it expedient to say something about weeds, with special reference to two which came under my notice last season, and were reported as being new in the districts from which they were sent for identification.

Any plant out of place is really a weed, even if it does possess considerable beauty. Some plants are so frequently out of place that they have been always known as weeds, such as the thistle, chickweed, bindweed, etc.

In Ontario we have somewhere about 150 species of plants commonly known as weeds,, and of these nearly 100 have been introduced from Europe. Every year adds a few more foreigners, and if farmers are not more vigilant in watching against these unpleasant invaders our Province will soon be overrun.

There is no doubt that weeds are on the increase in Ontario, both in numbers and species. This may be accounted for by the comparative indifference of many farmers to the growth of weeds on the roadside, as well as to the practice which now prevails of procuring a change of seed from other districts. The productive power of these pernicious plants will be better understood when the reader examines the results of observations on their seed-bearing capabilities.

In each case following, the seeds are from a single plant: purslane, 500,000; burdock, 400,328; cockle, 3,200; mustard, 31,000; Canadian thistle, 42,000; ox-eye daisy, 9,600; chess, 3,500; mallow, 16,500. When we consider this productive power and the vitality some possess, together with the peculiar mode by which many are distributed, the surprise is that we are not more overrun than we are, especially when unfortunately located near careless or indifferent farmers.

Weeds are largely distributed by the following means:

1. Along with grain obtained from other districts.
2. Animals carrying seeds attached to their bodies.
3. By the wind, where seeds are supplied with structures which enable them to be blown about.
4. Threshing machines carrying seeds from farm to farm.
5. Renting farm for a short time to men who are indifferent to the condition in which they leave the place, better or worse, and usually worse, than they found it.
6. Manure from city stables.

With such odds against him a farmer who desires to keep his fields clean must be vigilant, industrious and painstaking. However, if he observes the following hints he will succeed in destroying weeds:

1. Cultivate the land thoroughly.
2. Watch the roadsides and fence-corners.
3. Never allow the weeds to seed.
4. If possible, never allow weeds to have the benefit of sunlight; this can be effected by constant and thorough cultivation, and will soon result in a clean farm.
5. Secure the co-operation of fellow-farmers.

A knowledge of the nature of weeds becomes of importance in destroying them. Annuals live but a year, bear many seeds and when young are weak and tender, such as shepherd's purse, mustard, cockle, pennycress, wild oats, chess, ragweed, chickweed, sow thistle.

Biennials continue two years, and usually have a tap-root. Unless these plants are cut below the surface, cutting increases their vigor. Wild carrot, blueweed, burdock and mullein are biennials.

Simple perennials continue from year to year and will reappear till the root is utterly destroyed, of which are the ox-eye daisy, mallow, chicory, bindweed, sorrel and campion.

Creeping perennials are more or less jointed in the roots, each joint capable of growing if separated. Continued cultivation and smothering from light are necessary to kill these, among which are Canadian thistle, couch grass, toadflax, milkweed and sow thistle (perennial).

Sonchus arvensis. (perennial sow thistle) has made its appearance in the neighbourhood of Stratford, from which the specimen sent to the college came. It is considered a troublesome weed in the old country, and belongs to a class the representatives of which are very difficult to destroy on account of the creeping rootstock already referred to. Like all members of the order *Compositæ* it produces many seeds. It bears a close resemblance to the common sow thistle, having a flower not unlike that of the dandelion, but the flower stalk, especially near the flower, is quite hairy. This weed being a perennial is likely to prove far more troublesome than the annual sow thistle and consequently should be kept under.

Thlaspi arvense (pennycress) has appeared in the vicinity of Almonte. It belongs to the order *Cruciferæ* and is closely allied to the mustard. It is well known along the Red River as French-weed and in that country has become a nuisance, having in some cases almost completely overrun the fields. No doubt it has reached Ontario in seed wheat from Manitoba; it should be destroyed at once before it gets a foothold. The following description may be of service to identify it: pods round, flat, with broad wings and a deep notch; leaves oblong, arrow-shaped at the base, toothed, smooth; flowers white and very small; plant about a foot high. It derives its name, pennycress, from the size and shape of its seed vessels, which resemble silver pennies. Though found to some extent in Quebec, it is rarely seen in Ontario. Its introduction should be looked upon with suspicion, for (bearing many seeds) it will soon spread if not kept under and prove here as troublesome a weed as it has in Manitoba.

Apples.

In a former Bulletin attention was directed to results in grape growing at the College. I purpose in this giving our own experience in fruit trees, and it will be observed that our severe climatic conditions are as disastrous to the orchard as to the vineyard

The site for an orchard was selected by a committee of the Fruit Growers' Association in 1880; it embraced seventeen acres which, owing to the failure of many trees, has been restricted lately to an area of twelve acres. This was planted with a great variety of fruit trees, the apples thirty feet apart, and equi-distant from each other, according to what is usually called the *hexagonal* method.

In the first year nearly every tree grew, indicating that the planting had been successfully done.

The following data are important factors in accounting for failures:

Location: Latitude north 43° 38', height above the sea level 1,100 feet, above Lake Ontario 858 feet.

Exposure: Westerly inclined to north; no shelter of any account as yet.

Soil: Clay loam and somewhat gravelly on the north and west sides; partially drained.

Meteorology: Mean annual temperature of 1880-6 42.2°; mean summer temperature 57.1°, winter 27.3°; highest temperature (1881) 98°, lowest (1884)—35°; average number of days rain fell per year 72, rainfall, including snow, 24.7 inches; prevailing winds, southwest 43 per cent., northwest 31 per cent.

Crops have been grown each year in the orchard, chiefly roots, and a strip of land three feet on each side of the line of trees on which nothing is grown, but the soil is kept well cultivated. About five or six acres have been planted with raspberries, currants, gooseberries and strawberries, which are intended to be kept until the trees mature; this portion is also thoroughly cultivated. In autumn the trees are usually banked nine or ten inches. So far we have been but little troubled by insects or mice. The whole was thoroughly manured the third year with farmyard manure, and the portion on which the small fruits are grown has been manured a second time—1886.

At the time the trees were set out a wind-break was planted on the north and west sides. This consists of two rows of Norway spruce, eight feet between the rows and twelve feet between the trees, the trees of each row alternating. These trees are doing well, and will soon be a great protection from the westerly winds which prevail here.

In the following record of results the figures in brackets are the total of each variety planted.

Pears.—55 varieties were planted, and all have failed to reach the seventh year; the few that led a precarious existence for a few years have been rooted out.

Plums.—28 varieties; the surviving ones being Lombard 4 [6], Bradshaw 2 [5], Purple Egg 3 [5].

Cherries.—18 varieties; Olivet 1 [2], May Duke 6 [7].

Apples.—54 varieties; Swazie Pomme Grise 20 [50], Golden Russett 31 [50], Rhode Island Greening 7 [22], Roxbury Russett 6 [20], Grimes' Golden Pippin 7 [25], Wagner 20 [25], Yellow Bellflower 27 [35], Baldwin 6 [40], Swaar 5 [12], Pomme Royal 13 [22] Fameuse 10 [12], Lady 2 [2], King of Tompkins County 1 [12], Beauty 2 [2], Maiden's, Blush 2 [2], Ella 1 [2], Wealthy 2 [2], Tallman Sweet 22 [22], Northern Spy 32 [50], Ben Davis 6 [6], Mother 2 [2], Pewaukee 2 [2], Twenty-Ounce 10 [12], Beauty of Kent 7 [5], Rambo 2 [2], Fall Pippin 12 [12], Chicago 4 [12], Lady Sweet 2 [5], Alexander 34 [35], American Golden Russett 11 [25], Dora 1 [2], Ribston Pippin 22 [35], Gravenstein 2 [27], St. Lawrence 2 [2], Crabs 5 [5], Keswick Codlin 2 [2], Early Harvest 2 [2], Summer Rose 2 [2], Duchess of Oldenburg 35 [37], Benoni 4 [4], English Russet 2 [8], Red Astrachan 6 [5], Mann 8 [10], Shiawasse 9 [10]: 737 planted, 406 living, 331 dead.

In all cases where the trees have become sickly and have died the bark on the south side turned dark colored; as soon as this condition was attained a marked change occurred in the vitality of the tree, growth seemed retarded and in a short time the tree ceased to live. This condition appears to result from the effects of the warm spring sun before the frost has left the roots and a proper circulation has commenced throughout the whole tree.

1. The climate in this vicinity is too severe for raising any but the *very* hardiest of fruit trees. Our experience is borne out by several in this neighbourhood whose orchards are yearly becoming thinned out.

2. The varieties which have withstood our adverse surroundings best are: Ben Davis, Alexander, Tallman Sweet, Fall Pippin, Duchess of Oldenburg, Red Astrachan, Benoni, Wealthy, Maiden's Blush, Pewaukee, St. Lawrence, Earl Harvest.

3. The small fruit have done excellently; to these reference will be made in another Bulletin.

4. All orchards exposed to winds continuing largely from one direction throughout the year should have a wind-break for shelter on the side from which the prevailing wind comes, and this should be planted as soon as possible. Few trees are better suited for this than the Norway Spruce, but it is not advisable to have them planted in one row close together, for in such cases the trees become a harbor for insects. A better way is to plant two or three rows in the manner already referred to.

5. The hexagonal plan of planting, in which the trees are in every case the same distance apart, is preferable, because—

(1) More trees can be planted on the same space;
(2) You can cultivate between the trees in three ways;
(3) The trees have more light and air.

6. Orchards should be well drained, especially where the climate is severe.

The Crane Fly: Tipula Oleracea Order Dipera.

Some time ago there was brought to my notice an insect which has on different occasions proved injurious in the low-lying districts on the western side of our province. A farmer who had suffered considerable loss from the larval form of the insect wrote, asking information regarding its nature and suggestions for its destruction. On being requested to send some of the grubs for identification and study, he forwarded several, which in the course of time developed into the perfect insect, and I was enabled to suggest a course of action which resulted in a good crop, where, had the seed been sown as formerly, it is likely the grain would have been completely destroyed, as it had been some time before. On ploughing the field he observed the grub that had destroyed his former crop, and thus was led to seek information, feeling that he must pursue a different course, if he desired satisfactory results.

The cause of this trouble is an insect called the Crane Fly, or Daddy Long-legs. It seems to be confined chiefly to our low-lying land in the west, but is very common in England, and often proves very destructive.

The flies (not unlike very large mosquitoes) are seen especially in autumn, in neglected grassy spots, meadows, and on marshy ground, where they deposit their eggs, which in due time produce grubs that destroy grass and grain crops by gnawing the young plants just below the surface of the ground.

The female lays her eggs chiefly in autumn in the ground, or on its surface, or on damp grass close to the ground. These eggs are very small, black and shiny, and as many as three hundred have been found in one female,

In spring the grubs or worms hatched from the eggs appear, and begin to feed upon the plants at hand. They are legless, cylindrical, of a dirty greyish colour, wrinkled across, and when full-grown about an inch to an inch and a-half in length. The tail of the grub ends abruptly, as if cut off; the head is protruded as a blunt point, armed with two strong black jaws. Though legless, the grub has such power of contracting and expanding in length that it can readily pierce the ground or wriggle itself forward. It is often found at night on the surface of the ground. From the toughness of its skin the grub is sometimes known as "Leather Jackets." Having reached full size about the middle of May, it becomes exceedingly destructive for a time. Those which were sent to the College passed into the pupa stage about the third week in May. The larva is exceedingly hardy. It can be frozen till quite brittle, and yet, when thawed, be active; it can be immersed in water 100 hours, and can do without food for over three weeks.

The resting or quiescent state, usually called pupa, is undergone below the surface but sometimes under the protection of weeds. The pupa (containing the future fly) is furnished with short stout spines, pointing backwards, by means of which, when the proper stage of development is reached, it can raise itself upward through the ground. As soon as it reaches the surface and rises a little above it, the horny-like pupa case splits, and leaving the empty case standing upright the Crane Fly comes forth and spreads its legs and two wings. The specimens developed at the College completed their pupa stage about the 29th of May. This is important to remember, because a crop sown after that date will in all likelihood escape injury by the grub. Our instructions to the correspondent were based on this observation, and, on inquiry, we found he had succeeded in getting an excellent crop of beans which had been planted on the 11th of June.

The perfect insect resembles very much in external appearance the mosquito, but is about four times as large. It has one pair of wings, and behind them a couple of slender

structures, one on each side, with a knob at the end. These delicate rodlike structures are about the tenth of an inch in length. The body of the insect has a tawny brownish appearance.

1. Prevent as far as possible the depositing of eggs. The female seeks damp meadows, neglected herbage, and shady spots found at the sides of cultivated fields and under the shade of trees in open fields. Remove such conditions by drainage, mowing the neglected ground and burning the mixed grass and tops of weeds. The pasturing of sheep on affected places is good, as they eat the grass well down and trample the ground a good deal.

2. Many birds are of great help both in destroying the larva and the full grown insect; consequently, a method of cultivation calculated to expose the grubs for the birds will result beneficially.

3. Deep ploughing of infected pasture is a good practice, as it prevents the hatching of the eggs and places the grubs where many are likely to perish for want of food. Rolling the land, especially late in the evening or at night, has been followed with good results, for many are crushed and others are impeded in their progress through the soil.

4. The application of certain fertilizers, such as guano, salt and nitrate of soda, are beneficial in promoting a quick and healthy growth, thus enabling the plants to withstand an attack. Some have found an application of gas lime on the fields before breaking up serviceable.

5. Sow as soon as the larval condition is past,—in the case under consideration about the first week in June. As soon as the pupa cases are seen sticking up in the soil the grub stage has ended, and the insect is fully developed. A well drained soil, thoroughly worked and pulverized ground, and plenty of manure are very likely to keep off an attack.

In Bulletin v. of 1886, referring to shrubs, I remarked: "Where shrubs are planted in clumps, they grow better by having all the land between them cultivated." This season we followed this out with all our clumps, and notwithstanding the extreme drought, a marked improvement in growth resulted.

In Bulletin VIII., 1886, referring to grapes, some notes were given, relating to the ripening of the varieties in our vineyard. Owing to the warm summer of this year, followed by a delightful fall, a great advance was made in the ripening of our grapes.

The following notes may prove of interest to some readers. The dates indicate when the varieties were cut:—

September 5th, Champion, Janesville, Maxim, Brant.

September 7th, Moore's Early, Cottage, Early Dawn, Ives' Seedling, Alvey, Croton.

September 10th, Hartford, Prolific, Massasoit, Agawam, Cornucopia, Black Hawk, Black Eagle.

September 15th, Eldorado, Brighton, Advance, Aulochon.

September 17th, Salem, Delaware, Concord, Wilder, Gaertner, Warden, Lady, Jessica.

September 20th, Draucut's Amber, Herbert, Lindley, Merrimac, Enmelan.

September 24th, Amber Queen, Barry, Clinton, Martha, Rogers' 41.

September 26th, Dempsey 4, 18, 25, Poklington, Prentiss, Transparent, Walter.

September 28th, Elvira, Eva, Green's Golden, Iowa, Lady Washington, Maxatawny, Naomi, Noah.

September 30th, all varieties gathered in; while in 1886 a note says, October 2nd, "the best were cut viz: Lindley, Delaware, Moore, Salem, Massasoit, Wilder, Herbert, Merrimac, Enmelan, Concord." October 7th, "Clinton, Brighton, Agawam, and Martha Ripe.

Concerning this department, I need only say that much attention has been given to make the study of science popular and practical. Excursions have been made from time to time with the students, for the purpose of studying botany and geology in the field. Elora, Galt, Rockwood and Niagara Falls were thus visited, and through the kindness of the Grand Trunk Railway authorities our students were able to travel at reduced rates on scientific trips; the expenses of which are borne by themselves. The

result of these trips is a greater interest in agricultural science; travelling as they do from place to place, they observe the condition of farms, etc. in the different localities, and cannot fail to have their practical knowledge greatly increased.

Reference has already been made to the plants set out in a part of the garden to illustrate lectures on botany. The purchase of a superior magic lantern, by which excellent views of objects discussed in the lectures can be exhibited, will also do much to impress scientific facts upon the minds of our students. Already its usefulness has been shown in the vivid way it illustrates sections of plants, microscopic organisms and other objects connected with the study of agricultural science. No half hour is more popular among the students than that in which these magnified views are projected upon canvas before the class.

To make the lectures on horticulture as practical as possible, the chief points discussed theoretically in the lecture-room were written out, numbered and given to Mr. Forsyth, superintendent of the garden, so as to enable him to see, what he might be expected to show the students practically. Experience had taught us that owing to the method of sending our students to the various departments, instances occurred where some had not seen a practical demonstration of these things. To overcome this liability to overlook some and repeat work to others, the form below was prepared. The practical instructor repeatedly consulted this, and was thus at a glance able to see whom he had instructed and what had been taught.

Blank form illustrating the method of keeping a record of practical instruction:

Names of Students.	1.	2.	3.	4.	5.	6.	7.	8.	Etc., to 20.
.....		X		X	X		X		
....									
....	X			X	X		X		
....			X			X			
....	X			X				X	

Nos. 1, 2, 3, etc., to 20, represent points to be illustrated in practical horticulture; these are written out in full in the instructions referred to, so that a number indicates at once the subject *e. g.* 5 is grafting, 8, pruning grape vines. As each student is taught, the space opposite his name and under the number is marked X, and thus the instructor sees at once the work accomplished from week to week.

METEOROLOGY.

Report of Observations taken at the Ontario Agricultural College during 1877.

Observations are regularly taken at the hours of 7 a.m., 2 p.m., and 9 p.m., daily, and recorded in a book printed for the purpose. The instruments in use are as follows:—

Anemometer—Recording the direction of the wind and indicating the number of miles travelled.

Barometer—Showing the atmospheric pressure at the time of observation.

Maximum thermometer—Indicating the highest temperature between times of observation.

Minimum thermometer—Indicating the lowest temperature between times of observation.

Hygrometer—With *dry* and *wet* bulb thermometers, for the purpose of showing the condition of the atmosphere with reference to moisture.

Pluviameter—Used in measuring the rainfall.

Thermometer—For observing ordinary temperature.

Besides taking observations from these instruments, the cloudiness of the sky is observed, and general remarks on the weather for the day are recorded in the daily register. At the close of each month a summary of the month's observations is given to the Guelph papers for publication. From these monthly summaries the condensed statement of the year's meteorology is made out.

In my course of lectures on Meteorology, the practical method of teaching is adopted. The instruments named above are fully described, and the students taught not only how to read them, but also to epitomize the observations taken in such a way as to make them interesting and instructive.

Form of Monthly Summary.

A summary of the meteorological observations taken at Ontario Agricultural College during the month of.....

Normal height of barometer at Guelph (1,100 feet above sea level and 858 above Lake Ontario), 28.86 inches. Latitude north 43°-38′.

Barometer—
- Highest barometer.
- Lowest "
- Highest mean barometer.
- Lowest " "
- Monthly " "
- Monthly range.

Thermometer—
- Highest thermometer.
- Lowest "
- Highest mean thermometer.
- Lowest " "
- Monthly " "
- Monthly range.

Pluviameter—
- Days rain fell.
- Greatest rainfall.
- Days snow fell.
- Greatest snowfall.
- Total precipitation.

Anemometer—
- Direction of wind.
- Greatest number of miles travelled in twenty-four hours.
- Mean velocity per month.

Clouds—
- Cloudy days.
- Clear days.
- Mean cloudiness for the month.

MEAN METEOROLOGICAL RESULTS FOR THE YEAR 1887.

—	1887. — GUELPH.	Average of 40 Years. — TORONTO.
BAROMETER.		
Month of highest mean pressure	November.	September.
Highest mean monthly	29.632	29.664
Lowest " "	28.170	29.572
Month of the lowest mean	February.	June.
Highest pressure	29.708	30.358
Lowest "	28.006	28.692
THERMOMETER.		
Mean temperature of the year	44.03	44.17°
Warmest month	July.	July.
Mean temperature of the warmest month	73.2°	67.64°
Coldest month	January.	February.
Mean temperature of the coldest month	15.3°	22.73°
Highest temperature	July 16, 96°	91°
Lowest temperature	Jan. 8—14.1°	11.9°
Range of the year	110.1°	102°
PLUVIAMETER.		
Total depth of *rain* in inches	16.28	28.30
Number of days on which *rain* fell	77	110
Month in which the greatest depth of *rain* fell	August.	September.
Greatest depth of *rain* in one month	1.75	3.55
Month with most *rainy* days	October.	October.
Greatest number of *rainy* days in one month	12	13
Total depth of *snow* in inches	63.5	.....
Number of days on which *snow* fell	56	.....
Month in which the greatest depth of *snow* fell	February.	.....
Greatest depth of *snow* in one month	16.0	.....
Month with most *snowy* days	January.	.....
Greatest number of *snowy* days in one month	14	.....
Total precipitation in inches	22.63	.....

Diagram Illustrating the Mean Meteorological Results for 1887.

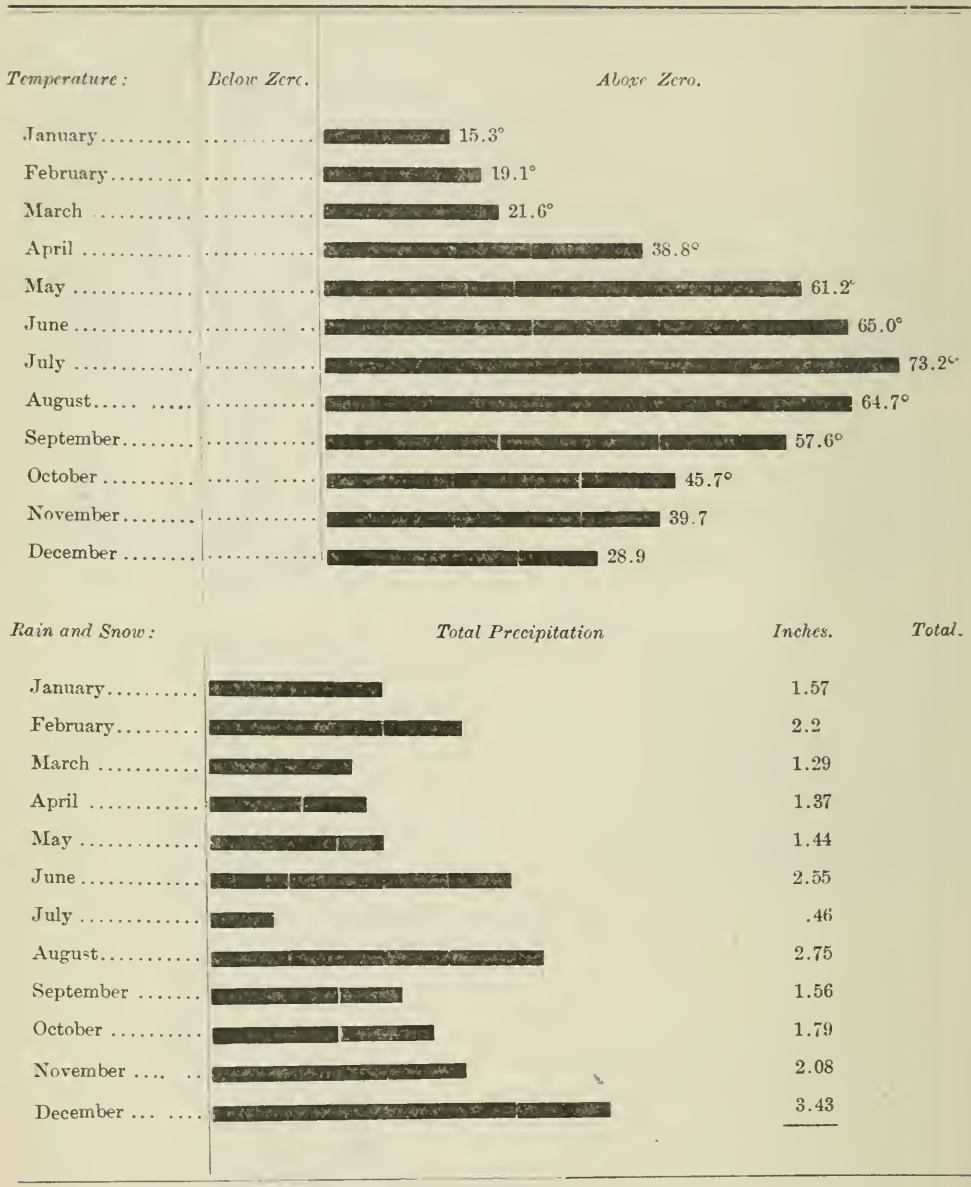
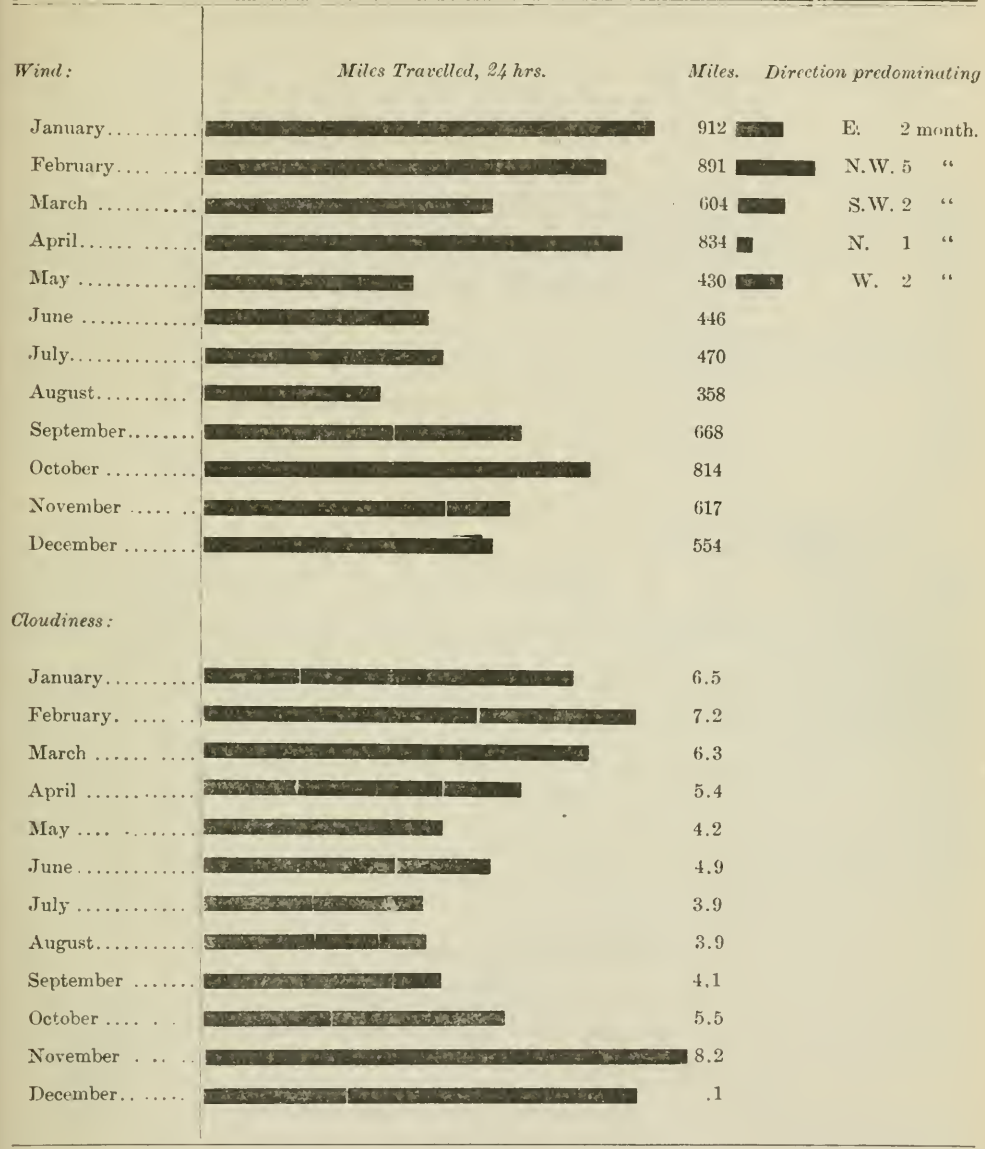


DIAGRAM ILLUSTRATING THE MEAN METEOROLOGICAL RESULTS.—*Continued.*



SUMMARY OF METEOROLOGICAL RESULTS FOR 1887.

—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Barometer—	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
Highest barometer	29.234	29.600	29.498	29.344	29.188	29.248	29.078	29.152	29.254	29.238	29.708	29.584
Lowest "	28.078	28.006	28.144	28.030	28.490	28.516	28.500	28.630	28.408	28.130	28.174	28.368
Highest mean barom'er	29.218	29.488	29.348	29.264	29.163	29.225	29.057	29.101	29.207	29.200	29.632	29.570
Lowest " "	28.185	28.170	28.283	28.254	28.498	28.555	28.581	28.669	28.482	28.237	28.261	28.462
Monthly " "	28.701	28.899	28.814	28.771	28.877	28.865	28.876	28.871	28.992	28.718	28.963	28.912
Monthly range..	1.156	1.594	1.354	1.314	.698	.732	.578	.522	.846	1.108	1.534	1.316
Thermometer—	deg's.	deg's.	deg's.	deg's	deg's.	deg's.	deg's.	deg's.	deg's.	deg's.	deg's.	deg's.
Highest temperature ..	44.2	47.0	45.5	72.5	89.0	88.2	96.0	95.6	82.3	76.2	66.4	53.0
Lowest " ..	-14.1	-3.5	2.2	6.0	37.0	42.0	50.0	38.1	28.8	14.2	1.5	-3.0
Highest mean " ..	40	39.7	34.6	48.0	71.0	75.3	80.0	81.0	68.2	61.2	52.5	39.6
Lowest " " ..	-.2	3.8	9.4	17.6	52.6	52.7	60.7	51.4	41.0	28.1	9.8	3.4
Monthly " " ..	15.3	19.1	21.6	38.8	61.2	65.0	73.2	64.7	57.6	45.7	39.7	26.5
Monthly range	58.3	50.5	43.3	66.5	52.0	46.2	46.0	57.3	59.4	62.0	65.4	56.0
Pluviameter—												
Number days rain fell.	2	4	3	8	8	10	5	6	8	12	7	4
" snow fell.	14	11	8	2	0	0	0	0	0	5	6	10
Greatest rainfall, inches	.77	.3	.24	.73	.67	.57	.38	1.75	.45	.36	.42	.96
Rainfall for month, in.	.10	.6	.42	1.28	1.44	2.5	.46	2.75	1.56	1.79	1.51	1.87
Greatest snowfall, in.	.3	.4	.25	8.	0	0	0	0	0	1.0	2.0	4.0
Snowfall for month, in.	14.7	16.0	8.7	.9	0	0	0	0	0	2.04	5.7	15.6
Total precipitation ...	1.57	2.2	1.29	1.37	1.44	2.5	.46	2.75	1.56	1.99	2.08	3.43
Anemometer—												
Predominating wind...	S. W.	N. W.	N. W.	E.	E.	N. W.	N. W.	N. W.	N.	W.	S. W.	W.
Greatest No. of miles in 24 hours.....	912	891	604	834	430	446	470	358	668	814	617	554
Mean velocity for the month	18.1	17.0	14.6	15.5	8.92	8.41	10.1	8.32	10.7	13.4	15.9	14.1
Clouds—												
Cloudy days	18	17	18	11	6	12	9	10	8	12	21	23
Clear "	9	3	12	11	16	17	18	18	16	11	8	7
Mean cloudiness for month	6.5	7.2	6.3	5.4	4.2	4.9	3.9	3.9	4.1	5.5	8.2	7.1

Your obedient servant,

J. HOYES PANTON,

Professor Natural History and Geology.

PART III.

REPORT OF

THE PROFESSOR OF CHEMISTRY.

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, December, 1887.

To the President of the Ontario Agricultural College :

DEAR SIR,—I beg herewith to submit my report for the year 1886. In doing so, I have to congratulate myself on the improved condition of affairs in connection with the Chemical department of the College and Farm. The dingy, dirty and unsuitable room into which was crowded lecture room, laboratory, office, storeroom, etc., has been superseded by the new Chemical laboratory wherein convenience, cleanliness and comfort have been well considered. Through you, I desire to convey my thanks to the Commissioner of Agriculture, and to all others interested, for the improved state of affairs. I trust that the Chemical department will show its gratitude by the work of the future. I consider the building well adapted for our purposes, and when the new apparatus is in place it will compare favourably with other laboratories of a similar nature. Everything will be in good working order by the beginning of the new year. Good results are already apparent ; the work in practical chemistry is much expedited, and the experiments illustrative of lectures are more complete and satisfactory than formerly. The benefits fully warrant the outlay by the Government. To be brief in reference to this matter, I may say that the principal benefits will be : the more thorough and more intelligible treatment of all lecture work ; the investigation of subjects of a more advanced nature ; the enlargement of our practical and experimental work ; the inculcation of habits of cleanliness and accuracy ; and, last but not least, the performance of work in an atmosphere and amid surroundings not depressive or hurtful to health.

Since our work embodies instruction, as well as practice and experiment, such voluminous reports are not to be expected from us as emanate from experimental stations wherein the work is purely analytical and experimental.

LECTURES.

Full courses of lectures have been delivered to the first and second year students. Since the inaugural of the third year, I have commenced a course of advanced lectures with them, more fully treating of subjects in Agricultural Chemistry and in the History and Philosophy of Chemistry. The subjects discussed with them during the first term have been :—The valuation of fertilizers ; the Canadian laws regarding fertilizers, oleomargarine, and adulteration the manufacture and nature of oleomargarine ; the

laws of the United States, England, France and Germany, regarding the manufacture, importation, and sale of butter substitutes; the origin of Chemistry as a Science; the development of the great Chemical laws; the application of Mathematics to Chemistry; the Periodic Law of Mendelejeff, and the possibilities of future research. The lectures will be continued during the coming terms. The reading assigned for examination for the third year is Roscoe's Manual on Metals, Non-metals, and the Carbon Compounds, (without any omissions), and Dr. Armsby's manual of Scientific Feeding. In practical work this fall, the third year has been considerably retarded owing to delay in completing the laboratory, but they are now making good progress. In the winter and spring term of the year, six ex-students returned for special work. Some were compelled to cut short their stay. To give some idea of the work done by advanced students, I shall quote two cases. First, a sample of salt used in experiment by the Experimental Union was analyzed by Mr J. J. Fee, and gave the following results :—

SALT.

Sodium Chloride—pure salt	89.42 per cent.
Calcium Sulphate—gypsum	1.45 "
Calcium Chloride	0.11 "
Magnesium Chloride	2.01 "
Water	6.75 "
Insoluble matter	0.18 "
	99.92 per cent.

Second, an experiment in feeding was inaugurated by Mr. J. J. Fee, Mr. A. T. Raynor and Mr. S. C. Calvert. The bulk of the work was performed, the analyses carried on in the laboratory, and the experiment successfully completed by Mr. S. C. Calvert. Being conducted most carefully by third year men under the constant supervision of members of the staff, this experiment not only was the means of teaching methods of advanced work of a most practical and important nature, but also may be referred to as reliable in its conclusions. In view of this, I deem a condensation of the winter report submitted to me, worthy of a place here. It will also show one very important line of work that may be undertaken by specialists or advanced students.

The experiment was on the question of milk production. The object was to ascertain, as far as possible, the comparative value of bran and oil cake as milk producers, quantity and quality. It was decided to take the Ontario Experimental Farm ration (as an example of a good milk producing ration) and to add to it a given amount of bran in the first division of the experiment; in the second, to substitute such an amount of oil meal as should equal in nutritive value the amount of bran added to the original ration, and which ought therefore presumably to give a similar quantity and quality of milk.

Two cows, a Quebec Jersey and a Guernsey, were handed over by Prof. Brown.

The daily allowance was 10 lbs. of hay, 24 lbs. roots, 2 lbs. bran, to which was added 9 lbs. of bran for two weeks (April 5th to 18th,) and then 3 lbs. of oil meal for two weeks (April 19th to May 1st). It was contrasting, therefore, bran with oil meal over and above a maintenance diet, as a milk-producing diet.

The feeding, milking and analysis, were all done by the students.

The milk from each cow was weighed and tested twice a day with lactometer and Feser's lactoscope. It was also chemically analyzed in the laboratory *eighteen times* during the four weeks.

Giving the animals one week in each case to get settled down to the new kind of food, the last week in each division of the experiment must be taken as shewing the true relative positions of the competing foods. The average yield per day of the two cows was in the last week of the bran 17.08 lbs., in that of the oil meal 18.45 lbs., or 1.37 lbs. per day more than the bran. The total gain per week on the two cows was 20 lbs. of milk.

The general average of the fats shewed the milk from the oil-meal ration to be *a trifle richer* than that from the bran.

Cost:—Allowing $10 per ton for hay, 8c. per bush. for roots, $12 per ton for bran, and $30 for oil meal, and estimating the cost of the food *actually eaten*, the bran ration cost $2.26 for two weeks, and the oil-meal ration $2.09.

There was, therefore, an increase of milk, a decrease of cost, and a slight increase of quality.

Finally, Mr. Calvert analyzed the bran and oil-meal used, and here are his results:—

———	Bran.	Oil-meal.
Water	14.30	12.87
Fat	3.50	8.71
Protein (Nitrogenous)	12.75	24.02
Crude Fibre	11.45	13.25
Nitrogen—Free Extract, (Starch, etc)	51.88	35.20
Ash	6.12	5.95

I shall make but one more extract from the very complete report presented:—"As the first attempt, the experiment was naturally not of a very complicated character, but great care was taken throughout to make it as exact and precisely accurate as was possible. Simple as it was, it has nevertheless been of no little practical benefit, and the more so as it has taught us the importance of being *scrupulously exact*—a characteristic so absolutely necessary and of so great importance in the detail management of any reliable experiment, great or small."

The above carries its own commendation. I submit, sir, that if we can foster such work we are doing our duty to the country.

On July 20th, 1877, the following bulletin was issued:—

BRAN—ITS CHEMICAL COMPOSITION.

The aim and tendency of modern milling is to produce as much *white* flour as possible from the wheat grain. The demand of the public stimulates this, regardless of the fact that the whiteness is not a proof of richness. To produce a white flour, the germ or embryo, which is very rich in nitrogen, is removed and sold as germ flour; the husk or covering is removed and sold as bran. A description of a grain of wheat will aid in understanding the composition of bran. At one end is the *brush*, or hairy covering; at the other end the *germ*. Commencing at the outside of the grain, we find the husk or bran coatings, sometimes given as three, sometimes as five, in number. These are fibrous in nature. Next comes a coating of gluten cells (the *perisperm*). The gluten is the nitrogenous compound of the wheat, and is of the highest nutritive value. Within these lie enclosed the starch or flour cells (the *endosperm*), containing also gluten cells intermingled with them. To separate these dark fibrous coatings, to sift out by themselves the greyish germs, and to retain as much of the white starch as possible, is the aim of the miller. In doing so he leaves behind most of the gluten coating with the bran. The old milling process left behind also with the bran a considerable quantity of starch. The roller process tends to remove all this starch; the result is that most of the bran produced by the roller process is richer in nitrogen (gluten) and poorer in starch than the bran produced under the old process, and is therefore of a higher nutritive value.

The relation of the bran and the germ to the whole wheat can be clearly seen in the following table from the Washington Report of 1886 (Mill products from Kansas) :

——	Water.	Gluten.	Fat.	Starch & Sugar.	Fibre.	Ash.
Whole Wheat	9.55	12.25	1.27	72.97	1.88	1.78
Bran	8.45	15.75	4.64	58.28	6.60	6.30
Finished Germ	8.70	20.13	7.47	54.91	3.59	5.20
Patent Flour	11.02	9.63	1.01	77.80	0.19	0.35

From this table it is at once seen that by the roller process the bran is richer in nitrogen and fat than either the whole wheat or the flour. It is, however, also to be noted that the nitrogen of the bran is not all in form suitable for muscle-building, but it is available for fat-production. The nitrogen of the flour is *albuminoid* in composition ; some of that in the bran is *amide* in composition.

The ash will, of course, be found in excess in the bran coatings. Its composition will average about as follows :

Phosphoric acid	54 per cent.
Potash	27 "
Magnesia	9 "
Lime, etc	10 "

The chemical composition of bran varies greatly, depending partly upon the composition of the grain, but principally upon the process of separation. I append a table gathered from several sources. No. 1 is the analysis of bran made by myself, and is the bran used and referred to by Prof. Brown in his late bulletins on feeding. No. 2 is another sample of Guelph bran analyzed here :

	——	Water.	Gluten.	Fat.	Starch & Sugar.	Fibre.	Ash.
1	Ontario Agricultural College, 1887	12.28	13.20	4.30	54.84	9.24	6.14
2	" " " 1887	14.30	12 75	3.50	51.49	11.83	6.13
3	Wheat bran (Armsby)	13.00	14.50	3.50	53.60	9.40	6.00
4	Coarse bran (Stewart)	11.40	12.90	3.50	59.10	8.10	5.10
5	Massachusetts, U.S., Report, 1887	12.20	19.79	2.80	59.16	10.92	7.33
6	Wisconsin bran (Armsby)	14.13	15.19	3.36	50.96	10.31	6.05
7	Virginia bran (Washington Report	8.24	16.45	5.52	56.77	6.13	6.89
8	Ohio bran (Washington Report)	7.74	15.40	4.99	64.88		6.99
9	Minimum % (Armsby)	7.60	10.10	1.70	28.50	4.10	....
10	Maximum " "	16.50	27.00	6.60	61.55	34.60	....
11	Average bran	13.00	15.00	3.50	52.50	10.00	6.00

As a comparison between old process and roller bran one quotation will serve (Wisconsin Report) ; added to which is a comparison of spring and winter bran (Jenkins).

——	Water.	Gluten.	Fat.	Starch & Sugar.	Fibre.	Ash.
Roller (water free)	....	17.52	5.02	60.79	9.76	6.91
Old process "	....	14.79	4.27	66.12	9.23	5.59
Spring wheat bran	11.3	15.30	4.30	54.40	8.80	5.90
Winter wheat bran	12.3	16.00	4.00	53.70	8.10	5.90

Experiments have established the following as the digestible co-efficients or percentages for the various constituents of bran : Gluten, 88 per cent. ; fat, 80 per cent. ;

starch and sugar, 80 per cent.; fibre, 20 per cent. Using these values in the above tables, it will be seen that the nutritive ratio of bran varies from about 1:3 to 1:4.5.

Considered as a direct fertilizer, a ton of bran will give about as follows, reckoning from the 1887 rates:

Nitrogen	48 lbs. @ 16c	$7 68
Phosphoric acid	65 lbs. @ 6c	3 90
Potash	30 lbs. @ 4½c	1 28
Total value per ton		$12 86

These values are low. Dr. Jenkins gives for the same, $13.03, and Sir J. B. Lawes, $16.15, but the latter's estimate was made when rates were higher.

In conclusion, I add a table of analysis of brans other than wheat, which may prove of value:

——	Water	Nitrogen Compounds.	Fat.	Starch & Sugar.	Fibre.	Ash.
Rye bran	11.6	14.7	2.4	64.8	3.3	3.2
Buckwheat bran	14.0	17.1	4.4	46.4	14.7	3.4
Barley bran	12.0	14.8	4.1	45.6	19.4	4.1
Oat bran	9.7	7.1	2.3	57.9	19.3	3.7

Practical Conclusions.

1. Bran is a concentrated food, which, though variable in composition, possesses high nutritive value.
2. Roller-process bran is, on the average, richer than old-process bran.
3. Its excess of ash or mineral matters eminently fits it for bone-building in growing animals, and for supplementing the lack of mineral matters in roots.
4. Its chemical composition points to the conclusion that it is somewhat better adapted to the formation of fat and production of heat, than to the formation of muscle or of milk.
5. Both its chemical composition and its physical form adapt it admirably as a supplementary food to be used in connection with poor and bulky fodder, such as straw and roots.
6. Its manurial or fertilizing value alone repays its cost.
7. By retaining and feeding the bran upon the farm, the objection to selling the grain is partly overcome, viz., the exhaustion of the soil, since the bran retains most of the mineral matters which cannot be derived from the air.

Drainage Experiments.

We have no satisfactory results this year from our lysimeter experiments on account of the intense dryness of the past season. The total rainfall to November 1st was 8.783 inches or 1,986,937 pounds (nearly 1,000 tons) per acre; for 1886 it was 15.574 inches, while the average in England for ten years was 31.451 inches. During such a dry season, therefore, little drainage was to be expected, and the present year has been practically barren of results. For the six months, May to November, drainage water was received from only four lysimeters, the permanent pasture, the fallow, clay under oats, and sand under oats, and for *only one month*, the month of May. The quantity was so small that we do not consider the results of any importance.

The following bulletin was issued May 2nd, 1887 :

DRAINAGE WATER.

In estimating the worth of a fertilizer, commercial values are set only upon the nitrogen, phosphoric acid and potash ; sometimes the lime is considered. The three first mentioned are of most importance, since nearly all soils contain sufficient of the other plant food to sustain ordinary crops. To grow crops it is necessary, therefore, to supply nitrogen, otherwise the land will become exhausted. The ordinary crops annually remove from the soil the following quantities of nitrogen per acre :

				TOTAL.
Wheat .....(30 bushels.)	Grain 33 lbs.	Straw....12 lbs.		45 lbs.
Barley .....(40 ")	Grain 35 "	Straw....12 "		47 "
Oats .....(45 ")	Grain 38 "	Straw....14 "		52 "
Hay.....(1½ tons.)	....	45 "		45 "
Red Clover.....(2 ")	.....	70 "		70 "
Turnips ....(17 ")	Roots 63 lbs.	Tops.....45 "		108 "
Mangels.....(22 ")	Roots 85 "	Tops.....46.5 "		131.5 "
Potatoes.....(6 ")	Roots 42 "	Tops, etc. 18 "		60 "

The rain carries into the soil from the atmosphere every year from five to ten pounds ; other sources of supply besides that of direct applications of a nitrogenous fertilizer are, as yet, somewhat uncertain.

The nitrogen, however, before it is in form available for cereals must be converted into a *nitrate*, a compound resulting from the union of nitric acid with some such substance as lime. This formation of nitrates in the soil is called *nitrification*, and every farmer should be thoroughly familiar with the conditions under which it proceeds.

The process is one of fermentation in the soil. The work is done by a very minute organism or vegetable cell (called *bacterium*), similar to the yeast cell and other vegetable organized bodies producing the various fermentations. It is found in all fertile soils, and for its development and work demands a supply of air and water. Tillage therefore assists in the process. The presence of too much water excludes the air and hinders the work, even undoing it. Drainage therefore increases the range of nitrification and deepens the fertility. A proper degree of heat is also most important. Nitrification ceases below and near the freezing point. As the temperature rises to 98° Fahrenheit (37°C) activity increases. From that point it again diminishes to about 131° (55°C), when it ceases. Under these conditions nitrification proceeds most actively during the summer, and continues even into the autumn. The nitric acid thus formed unites with lime principally, forming nitrate of lime, or *calcium nitrate.*

In the spring there are few, if any, nitrates to be washed out of the soil ; in the summer there is but little, if any, drainage to wash out the nitrates ; in the autumn, therefore, when nitrates have accumulated and drainage is also abundant, we may expect the greatest loss.

In the Experimental Department of our farm we have a set of drainage measures, or lysimeters ; also a large rain gauge. The area of each drain gauge is $\frac{1}{10,000}$ of an acre, and that of the rain gauge $\frac{1}{1,000}$ of an acre. The former are 36 inches deep, and contain the soil preserved in its natural condition and position. The soil in three of them is eight inches sandy loam, ten inches reddish clay, fourteen inches of gravelly loam, and four inches pure building sand.

One has been covered with permanent pasture, manured in 1884 with farmyard manure, 14 tons to the acre. A two year's rotation, bare fallow and fall wheat, has been kept up on two of the others. containing similar soil. These two are manured every other fall, before seeding, at the rate of 14 tons per acre. Thus the same soil is treated each year as pasture, fallow and fall wheat, and we can compare results.

In this table are given the total rainfall for seven months (May to December), the drainage from each, the soluble matter washed out from each, and the quantity of nitrogen, principally in the form of nitrates.

Month.	Crops or fallow.	Rainfall, lbs. per acre.	Drainage, lbs. per acre.	Solids, lbs. per acre.	Nitrogen, lbs. per acre.
May	Permanent pasture	29.0870	12.1220	1922	.6340
May	Bare fallow		17.1600	2705	.9455
May	Fall wheat		6.2920	1031	.1534
June		53.6172			
July		17.7061			
August	Bare fallow	97.4857	3.1900	561	.0828
September	Bare fallow	43.0751	4.4220	814	.1243
October	Bare fallow	53.5038	15.1360	2866	.5028
November	Bare fallow	58.3781	10.0300	3930	2.4300
December	Fall wheat		1.2584	205	.3505
May to December	Permanent pasture	352.8530	12.1220	1922	.6840
May to December	Bare fallow		58.9380	10876	4.0854
May to December	Fall wheat		7.5504	1236	.5039

The above rainfall represents a fall of 15.574 inches. The drainage from the permanent pasture was 3.4 per cent. of the total rainfall, that from the bare fallow 16.4 per cent., and from the fall wheat 2.1 per cent.

In England for ten years the rainfall amounted to an average of 31.451 inches, and the drainage to about 45 per cent. Under such conditions there is greater loss of nitrates by drainage, since the period of nitrification is much longer and the washing continues summer and winter. From a wheat field, unmanured, the average annual loss was ten to twelve pounds; from unmanured and uncropped land as high as 41.81 pounds per annum (Lawes and Gilbert).

From a glance at our table we draw conclusions similar to those elsewhere obtained, viz.:

The loss of soluble ingredients from a bare fallow exceeds that from a field under crop.

There is loss from a wheat field after maturity.

The advantages gained by fallowing may be greatly modified by loss in drainage water.

A growing crop tends to hold the nitrogen in the soil.

The fall washings are greater than those of summer.

The following may be practised either to clean dirty land or to rest exhausted land: In the former case, to avoid excessive loss by drainage, recourse may be had to roots *thoroughly cultivated*. To improve an exhausted land, instead of allowing the land to lie fallow a whole year, a green crop might be ploughed under, thus keeping all the nourishment in the soil, increasing it by drawing on the air and subsoil, and by decreasing the drainage. For green manure, red clover, rye and buckwheat are specially recommended; other crops such as rape, white mustard, scarlet clover, etc., are also used. These should be ploughed under just before full blossom.

On the whole most soils will improve best under a combined treatment of green manuring and fallowing, where resort is necessary to such treatment.

During 1887 the three lysimeters above mentioned (sand, loam, clay) were sown with white cluster oats, and the results were as follows: 272 heads from the loam, 234 from the sand, and 139 from the clay.

The Temperature of the Soil.

Heretofore it has been the custom here as in a few other places, to give the results of observations in tabular form. For a better understanding of the subject and as a step toward more practical results, I shall condense the report and place a few of the most interesting facts in more intelligible form.

The importance of making daily obesrvations of soil temperature is, I think, not fully appreciated by the farming community. That proper temperature has much to do with plant growth and development, no one will deny; but that it is wise to follow day by day, almost hour by hour, the changes of temperature in the soil at various depths, few will admit. Before laws and principles can be deduced, and before these can be profitably applied, facts have to be tabulated—this seems to be the tabulative period in the development of the science of soil heat. We must first understand exactly the causes of variation of temperature. Heat is a most potent factor in the preparation of available plant food in the soil, it is as potent in the germination and complete development of the plant. Independently of the quantity and quality of sunlight and the state of the atmosphere, the soil itself has a temperature dependent on three factors.

(1) *Composition :* the constituents of the soil differ in their power of *conducting* heat; sand heats up more rapidly than limestone.

(2) *Colour :* the darker a soil is the more heat it will absorb. Dark coloured soils often have a longer season than light colored.

(3) *Wetness :* wet soils are cold for two reasons; water requires more heat (specific heat) to raise its temperature than does the solid soil, and if it should evaporate from the surface it will take up heat (latent heat) from the soil, thereby cooling it.

The first table I append is one giving the average temperature of soil at different depths for each month and for the whole period of observation (May to October).

The soil thermometers are placed in uncovered soil at depths of 1, 3, 6, 9, 12, 24, 48 inches, and also at 3 and 9 inches in sand, clay and loam, which this year bore oats as a crop. The readings were taken three times a day (morning, noon and night); the averages are here given.

It must be remembered that the season was warm and very dry.

The 24 inch thermometer broken in 1886 was not replaced until late in June.

Average of each Thermometer for each Month and for whole Period.

Instruments.	May.	June.	July.	August.	September.	Average for the whole period.
Barometer	28.880	28.859	28.892	28.864	28.936	28.886
Attached Thermometer	63.97	68.99	77.36	67.61	58.31	67.25
Temperature of air	60.49	65.02	72.87	65.58	55.83	63.96
" wet bulb	55.54	61.39	67.49	60.06	52.24	59.34
Temperature, maximum	70.14	74.54	85.41	77.27	67.57	74.99
" minimum	46.93	53.06	58.20	50.14	41.75	50.01
Soil temperature at 1 inch in depth	61.53	68.35	77.53	69.24	58.28	66.99
" " 3 inches "	60.38	68.25	77.39	68.93	58.48	66.69
" " 6 " "	59.17	66.73	75.69	68.52	58.84	65.79
" " 9 " "	57.61	65.25	73.74	67.75	58.90	64.61
" " 12 " "	55.86	63.88	72.13	67.25	59.04	63.63
" " 24 " "			66.61	65.28	59.01	63.56
" " 36 " "	49.29	57.39	64.81	64.96	59.37	59.16
" " 48 " "	46.11	54.77	61.74	63.22	58.68	56.90
" " 3 " " in sand	62.68	65.99	73.03	69.06	57.75	66.50
" " 3 " " in clay	62.66	67.59	76.85	69.73	58.48	67.10
" " 3 " " in loam	61.92	65.08	78.15	10.12	57.95	66.64
" " 9 " " in sand	59.48	65.02	74.12	68.25	58 40	65.05
" " 9 " " in clay	58.45	64.62	76.85	68.50	58.48	64.38
" " 9 " " in loam	59.48	64.03	74.60	68.73	57.83	64.93

Conclusions.

(*a*) The average temperature of the soil, to the depth of nearly 12 inches, was greater than the average temperature of the air. The soil is heated principally by the direct rays of the sun; the air is heated principally by contact with the warmer soil.

(*b*) The average temperature of the soil diminishes with the depth.

(*c*) July was the month of greatest average heat of air and soil.

(*d*) In increasimg from May to July the soil gains in heat more rapidly than the air; it has a greater *conserving* or storing power for heat.

(*e*) The average increase from May to June was in air 4.53°, at 1 in. 6.82°, at 3 in. 7.87°, at 6 in. 7.56°, at 9 in. 7.64°, at 12 in. 8.02°, at 36 in. 8.10°, and 48 in. in 8.66°—the increase was greatest at the greatest depth.

(*f*) The average increase from June to July was: air, 7.85; 1 inch, 8.18; 3 in., 9.14; 6 in., 8.96; 9 in., 8.49; 12 in., 8.25; 36 in., 7.42; 48 in., 6.97. The increase noticed from May to June in regard to depth does not hold here. To the depth of 3 inches the increase varies directly with the depth, below that it varies inversely as the depth. Here, then, seems to be the place and the time of maximum heat in the soil, at 3 inches during July. By consulting the subsequent table of highest readings, it will be seen that on July 8th, at 2 p.m., at one inch the thermometer shewed 96°, and at 3 inches, 95.8°. Taking individual and average readings, then, at about 3 inches depth, about July 8th the maximum heat of the soil was attained during the summer of 1887. This applies to a sandy soil uncovered, lying fallow. By consulting the subsequent table it will be seen that in the case of the three soils covered with vegetation, the day of maximum heat was in August, and corresponded more closely with the day of greatest atmospheric heat.

(*g*) From July to August the air decreased in temperature by 7.29°; the decreases in the soil were as follows:—at 1 inch, 8.29°; at 3 in., 8.46°; at 6 in., 7.17°; at 9 in., 5.99°; at 12 in., 4.88°; at 24 in., 1.33°; at 36 in., *the increase* 0.15°; at 48 in., *the increase* 1.48°. As before, the greatest variation was at 3 inches. The decrease varies directly with the depth to 3 inches; it varies indirectly with the depth below 3 inches.

(*h*) From August to September the air decreased in temperature by 9.65°; the decreases in the soil were as follows:—at 1 inch, 10.96°; at 3 in., 10.45°; at 6 in., 9.68°; at 9 in., 8.95°; at 12 in., 8.21°; at 24 in., 6.27°; at 36 in., 5.59°; at 48 in., 4.54°. During this month the decrease in temperature varies indirectly as the depth.

The above facts may be more clearly seen from a table as follows, representing the increase and decrease. * represents increase; — represents decrease.

——	May to June.	June to July.	July to August.	August to September.
Air	* 4.53	* 7.87	—7.29	— 9.65
1 Inch	* 6.82	* 8.18	—8.29	—10.96
3 "	* 7.87	* 9.14	—8.46	—10.45
6 "	* 7.56	* 8.96	—7.17	— 9.68
9 "	* 7.64	* 8.49	—5.99	— 8.95
12 "	* 8.02	* 8.25	—4.88	— 8.21
24 "			—1.33	— 6.27
36 "	* 8.10	* 7.42	* 0.15	— 5.59
48 "	* 8.66	* 6.97	* 1.48	— 4.54

(*i*) The difference in the readings of the thermometer at 3 and 9 inches in the open soil, and those in the sand, clay and loam, will present some difficulties. In the case of the latter the oats were sown on April 30th, and cut on sand July 16th; on loam, July 25th; on clay, July 27th. The stubble was ploughed August 3rd. The general tendency of the crop was to postpone the period of maximum heat. Comparisons should be instituted for the months May, June and July.

(*k*) From different daily observations, the hourly variation of temperature increased as the surface was approached.

To show the variation of temperature at different depths I give the following table of records, wherein are seen the variations between two successive readings, that is the greatest rise and the greatest fall during a period of seven hours.

GREATEST VARIATION IN TEMPERATURE of each thermometer in seven hours.
(*a*) Increase. (*b*) Decrease.

	Increase.				Decrease.			
	Date.	From.	To.	Variation.	Date.	From.	To.	Variation.
Temp. air	May 19	44.1	75.4	31.3	July 16	88	94	26
	Aug. 31	46.5	77.8	31.3				
Temp. soil 1 inch deep	July 8	63.2	96	27.2	May 20	64	84	20
" 3 inches deep	May 20	52	81.7	29.7	June 14	71.5	90.8	19.3
" 6 "	May 20	53.5	68	14.5	May 19,20	53.5	64.5	11.0
" 9 "	May 17	56.7	68	11.3	May 17	58.8	68	9.2
" 12 "	May 20	57	61.3	4.3	Aug. 10	69.2	73.8	4.6
" 24 "	July 8	65.8	67	1.2	June 8	56.7	58.2	1.5
" 36 "	June 30	60	60.6	.6	July 26	56.5	57.2	.7
" 48 "	July 4	63	64	1.0	July 4	63.3	64	.7
" 3 sand	Aug. 30	49.8	81.6	31.8	May 13	48.8	75.4	26.6
" 3 clay	Sept. 5	52.7	85.7	33.0	Aug. 2	76	102	26
" 3 loam	July 29	59.9	10.2	42.1	Aug. 5	71.2	100.7	29.5
" 9 sand	June 27	64.8	79.6	14.8	June 27	64.9	79.6	14.7
" 9 clay	June 21	60.4	66.5	6.1	July 29	74	80	16
" 9 loam	Aug. 29	55.7	64.7	9.0	Sept. 2,3	57.7	66.8	9.1

TABLE OF HIGHEST SINGLE READINGS OF THERMOMETERS at different depths with date of same (for air also).

Situation of Thermometer.	Date of Maximum Temperature.			Maximum Temperature.
	Month.	Day.	Hour.	
Thermometer in air	August	4th	.....	93.7°
Thermometer in soil at depth of 1 inch	July	8th	2 p.m.	96
" " 3 inches	July	8th	2 p.m.	95.8
" " 6 "	July	8th	2 p.m.	83.9
" " 9 "	July	8th	9 p.m.	80.7
" " 12 "	July	29th	9 p.m.	76 1
" " 24 "	August	6th	7 a.m.	69.4
" " 36 "	August	5th	9 p.m.	68
" " 48 "	August	5th	2 p.m.	64.9
Thermometer in sand at depth of 3 inches	August	2nd	2 p.m.	99.5
" clay " 3 "	August	2nd	2 p.m.	102.0
" loam " 3 "	August	2nd	2 p.m.	106.0
" sand " 9 "	July	29th	9 p.m.	81.0
" clay " 9 "	July	29th	9 p.m.	80.4
" loam " 9 "	July	27th	9 p.m.	81.7

Conclusion.

(*a*) The highest single readings do not correspond exactly with the highest average readings. The average is, of course, of more importance than single readings.

I shall now quote the average daily temperature observed on every day of rain and the day following :—

III.—Table of Readings for each day of Recorded Rain; also of following day.

Inches of Rain.	Date.	Barometer.	Attached Thermometer.	Air.	Hygrometer.	1 inch.	3 inches.	6 inches.	9 inches.	12 inches.	24 inches.	36 inches.	48 inches.	3 inches in Sand.	3 inches in Clay.	3 inches in Loam.	9 inches in Sand.	9 inches in Clay.	9 inches in Loam.
.13	May 1st (Sunday)																		
.01	" 2nd	8.834	66.1	64.96	59.4	56.83	56.53	52.46	49.3	46.96		40.73	38.6	57.2	49.7	57.9	49.0	58.9	49.3
	" 3rd	9.009	65.7	62.13	55.46	57.9	57.73	55.1	52.53	50.02		41.3	39.2	60.7	54.3	60.1	53.2	61.7	53.9
.336	" 6th	8.859	60.8	57.4	54.3	55.7	55.7	53.8	51.7	49.9		43.9	41.2	56.0	53.4	56.1	52.5	56.73	52.7
	" 7th	8.915	61.1	57.7	56.2	56.7	56.3	54.4	52.3	50.8		45.3	41.9	56.7	53.7	56.8	52.53	56.77	52.5
.007	" 17th	8.823	61.8	59.7	55.3	58 8	58.9	57.6	61.2	57.0		50.2	47.1	60.8	60.2	60.6	59.3	56.3	58.4
	" 18th	8.859	61.7	55.0	51.9	62.5	61.8	60.2	58.6	57.1		50.5	47.4	63.8	60.9	62.1	59.4	62.9	59.2
.67	" 24th	8.531	63.2	62.2	61.3	64.8	64.5	64.4	60.0	62.3		53.3	49.8	65.4	65.8	65.1	65.2	64.9	64.1
	" 25th	8.511	62.3	58.4	54.6	59.2	61.5	61.6	61.1	59.9		53.8	53.7	63.1	63.2	62.6	62.6	59.9	65.0
.17	" 27th	8.581	54.6	53.5	52.5	52.2	53.8	55.8	55.7	56.1		53.7	50.7	55.6	57.3	55.6	57.1	55.1	56.5
	" 28th	8.782	63.5	59.3	53.8	62.5	61.8	59.8	58.0	56.6		53.2	50.7	62.8	59.5	62.6	58.6	60.9	61.9
.19	" 31st	8.842	59.4	57.7	55.7	58.6	58.3	59.1	58.7	58.4		53.4	50.8	58.4	59.9	57.6	59.1	57.3	58 6
.044	June 1st	8.766	55.6	53.1	52.5	56.7	56.4	57.3	56.7	56.8		53.6	51.0	56.2	58.0	55.9	57.2	55.0	56.6
.392	" 2nd	8.936	59.2	57.5	57.1	59.6	59.2	58.7	57.5	56.9		53.6	51.0	59.2	58.0	59.1	57.9	58.5	57.1
	" 3rd	8.673	64.0	61 3	59.7	62.0	61.6	59.2	57.8	56 9		53.23	51.0	61.1	58.3	63.1	58.2	60.4	60.7
.61	" 4th	8.848	73.5	69.3	64.7	69.7	68.9	64.7	59.3	59.6		53.2	51.03	68.3	67.9	71.9	62.7	65.8	60.4
	" 5th (Sunday)	8.945	65.0	63.8	63.0	63.0	62.8	62.8	62.2	61.7		53.5	51.1	63.2	67.9	64.0	63.0	62.8	62.0
.286	" 17th	8.665	62.6	60.5	59.6	65.9	63.1	68.5	68.6	68.1	61.7	59.6	56.0	65.2	68.5	65.1	68.2	64.0	67.5
.18	" 18th	8.597	67.7	63.4	60.9	68.2	67.7	67.3	65.2	65.0	60.7	59.7	56.5	64.8	65.0	65.7	64.7	63.3	63.5
	" 19th (Sunday)	8.580	59.1	59.2	58.2	60.7	59.8	62.0	63.1	64.2	61.0	59.7	56.5	59.6	64.0	60.0	64.0	59.2	63.1
.304	" 21st	8.621	69.4	64.6	63.2	66.9	66.4	67.1	66.9	66.3	61.6	59.6	56.7	66.3	65.4	66.1	66.5	65.5	66.3
.441	" 22nd	8.547	69.7	65.1	60.1	66.5	65.9	65.4	64.7	64.4	60.9	59.9	56.9	63.0	64.7	63.9	64.5	62.7	64.4
	" 23rd	8.609	60.5	58.2	54.9	61.4	60.8	62.3	62.3	62.7	60.4	59.6	56.9	58.5	61.8	59.3	62.1	57.9	61.4
.022	July 3rd (Sunday)	8.944	82.0	80.0	72.3	76.1	77.0	72.0	71.3	71.1	64.7	62.4	59.0	74.8	72.3	78.0	71.8	75 8	73.0
.01	" 4th	8.903	82.7	79.2	72.2	81.1	81.2	77.9	75.1	72.7	65.3	63.4	59.7	78.3	74.3	79.2	73.8	79.2	74.3
	" 5th	8.841	75.7	71.7	68.4	76.5	76.6	75.5	73.8	72.3	65.6	63.6	60.0	75.2	73.6	74.9	73.1	75 8	74.2
.115	" 9th	8.578	74.9	71.3	68.4	73.1	73.2	73.2	72.8	72.3	70.0	64.4	61.0	72.7	73.7	73.1	73.3	71.8	74.3
	" 10th (Sunday)		61.1	60.0	56.6	64.3	64.2	67.3	68.6	69.5	66.2	64.7	61.2	64.7	70.7	64.2	70.1	63.8	71.2
.424	" 21st	8.779	75.0	71.7	69.1	73.7	73.5	74.0	73.1	72.3	67.4	65.9	62.8	74.1	74.2	73.5	73.9	74.5	76.0
.017	" 22nd	8.628	73.4	71.0	67.2	74.7	74.3	73.0	71.9	70.9	67.2	65.9	63.0	73.9	72.5	73.8	72.1	76.6	73.9
	" 23rd	8.957	65.2	63.0	63.2	69.7	69.9	71.7	71.6	71.5	66.9	65.7	63.0	69.0	72.6	75.4	72.1	71.9	74.1

III.—Table of Readings for each day of Recorded Rain.—*Continued.*

Inches of Rain.	Date.	Barometer.	Attached Thermometer.	Air.	Hygrometer.	1 inch.	3 inches.	6 inches.	9 inches.	12 inches.	24 inches.	36 inches.	48 inches.	3 inches in Sand.	3 inches in Clay.	3 inches in Loam.	9 inches in Sand.	9 inches in Clay.	9 inches in Loam.
.045	July 30th	8.853	77.8	76.0	70.7	76.5	76.1	75.5	74.5	73.4	68.0	66.8	63.8	77.5	76.6	77.7	75.9	79.5	77.6
	" 31st (Sunday)	8.882	68.8	67.0	63.1	68.2	68.0	70.0	70.9	71.6	68.2	66.8	63.9	68.8	74.0	70.9	73.0	69.5	74.9
1.71	August 5th	8.733	81.7	78.6	72.0	79.9	79.6	77.7	74.6	74.7	69.0	67.7	64.8	81.9	77.4	80.3	76.5	83.6	77.8
	" 6th	8.844	63.8	62.3	56.5	66.3	65.3	68.8	70.0	71.0	69.1	67.7	64.8	63.8	72.2	66.0	71.9	61.0	70.6
.46	" 11th	8.925	74.3	71.8	68.8	71.3	70.7	71.5	70.5	69.4	66.7	66.1	64.2	70.2	72.2	71.5	71.9	71.5	72.2
	" 12th	8.972	64.8	63.1	55.9	68.3	66.8	67.9	68.2	69.1	66.8	66.2	64.1	67.4	69.9	68.2	70.3	69.8	70.3
.182	" 17th	8.741	66.0	62.4	59.2	66.8	66.6	67.4	67.2	67.3	65.8	63.7	63.5	65.6	68.2	66.2	68.0	66.0	68.0
.082	" 18th	8.752	68.3	65.3	57.6	68.7	68.6	67.8	66.8	66.5	65.7	65.1	63.5	68.8	67.5	68.7	67.4	69.3	67.7
	" 19th	8.845	60.7	57.5	55.1	64.3	65.4	66.1	65.9	66.1	65.1	64.8	63.2	64.2	66.7	64.5	66.8	65.6	66.6
.09	" 21st (Sunday)	8.816	55.0	55.0	43.8	57.0	56.7	59.8	61.6	63.7	64.4	64.3	63.7	55.8	62.2	56.0	63.8	56.0	61.2
	" 22nd	8.695	64.9	61.7	62.0	64.1	64.1	64.0	63.4	63.5	63.4	63.7	62.6	63.6	63.8	64.2	63.7	63.8	63.6
.19	" 23rd	8.683	63.7	60.8	59.3	63.5	62.9	64.1	63.6	63.8	63.1	63.2	62.3	62.4	63.8	62.7	63.9	62.3	62.3
	" 24th	8.816	60.8	54.8	55.4	63.4	62.9	63.5	63.3	63.3	62.9	63.0	62.0	62.1	63.6	62.5	63.8	63.0	63.7
.132	September 2nd	8.836	65.2	63.6	59.4	65.9	65.9	65.4	64.3	63.6	61.4	61.3	60.3	65.7	64.4	63.6	63.8	66.4	64.8
	" 3rd	9.028	59.9	59.5	52.2	62.9	63.2	62.9	64.0	62.5	61.4	61.4	60.3	64.0	62.2	63.1	62.3	63.4	62.3
.040	" 6th	8.641	70.5	67.5	64.6	61.5	64.6	64.7	63.6	63.6	61.5	61.3	60.1	65.0	64.6	65.6	64.2	66.0	64.6
	" 7th	8.500	62.6	61.6	56.5	65.4	65.4	65.9	63.8	63.8	61.6	61.5	60.2	66.6	65.3	67.0	64.5	67.3	64.9
.194	" 9th	8.739	57.8	57.5	54.6	56.8	56.2	60.4	59.9	60.2	61.4	61.3	60.1	58.6	59.9	58.9	60.3	58.9	60.2
	" 10th	9.112	51.6	48.7	45.5	56.9	56.4	58.7	58.7	59.9	60.5	60.9	60.0	54.2	57.8	54.4	58.9	53.9	57.9
.45	" 13th	8.765	75.8	74.5	69.3	70.2	69.3	67.1	64.5	63.0	60.0	60.0	59.2	69.8	64.2	70.6	63.4	70.5	65.2
	" 14th	8.973	62.9	61.1	55.4	64.0	63.8	64.0	63.8	63.6	60.6	60.2	59.3	62.4	64.4	63.6	64.1	62.0	63.6
.022	" 15th	9.031	53.1	50.8	48.2	47.8	53.9	58.1	59.3	60.6	61.0	60.5	59.3	52.0	59.9	56.2	60.4	51.9	58.7
	" 16th	9.211	51.5	47.8	44.8	54.4	54.2	55.3	55.8	57.3	59.9	60.2	58.8	56.3	57.0	54.2	56.7	50.9	54.7
.450	" 21st	8.841	63.7	61.1	59.2	58.9	56.9	59.3	58.1	57.8	58.4	58.8	58.2	54.2	56.2	56.6	56.6	56.0	56.1
	" 22nd	8.755	52.7	51.5	48.3	53.4	53.1	55.7	56.5	57.6	58.2	58.5	58.0	52.6	56.7	52.9	56.9	52.7	55.6
.19	" 30th	8.772	59.1	57.5	57.4	58.7	58.2	57.4	56.2	56.1	55.2	55.9	55.5	57.1	55.9	57.7	55.2	57.9	55.9

Wood Ashes.

The subject of wood ashes was dealt with in the following bulletin issued August 25th, 1887 :

"The use of Canada ashes has of late steadily increased, and the cost gradually declined to 24 to 25 cents per bushel of 45 to 50 lbs. These are prices by the carload at Amherst and its vicinity." This is from the Massachusetts Experimental Station bulletin issued January, 1887. The prices in the Eastern States are based upon chemical analysis, 6 per cent. of potash and $1\frac{1}{2}$ or 2 per cent. phosphoric acid being the standard. Upon that standard fresh ashes will often exceed the above value.

Government returns state that in 1885 ashes were exported from Ontario to the value of $18,298, in 1886 to the value of $27,506. From Quebec, however, in 1885, ashes (pot, pearl and leached) were exported in value to $161,444 ; in 1886 in value $133,784. Since shipments are made almost entirely to Great Britain and the New England States, most of the Ontario ashes will be handled through Montreal.

In view of the above exportation, and of the great waste of ashes in Ontario, it is worth while for the farmer to consider whether it pays to waste, or to sell for five or ten cents in cash or barter, a bushel of ashes for which the enterprising New England farmer offers 25 cents by the carload.

Plants draw upon the air and soil for their nourishment. From the former they can obtain water, carbon, oxygen and nitrogen, either directly through their leaves, or indirectly through their roots from the washing of the rains. These build up starch, sugar, cellulose, woody fibre, fat and much of the nitrogen compounds (*albuminoids*, etc.) The ash or mineral matter, however, which is just as necessary for the vegetable and animal life, is derived from mineral salts of the soil. Hence it is of importance that the quantity of mineral matter in the soil be not decreased or exhausted. Products in the form of starch, sugar, fat and albuminoids can be sold without exhausting a soil, but the removal of ash, or mineral matter without compensation is a sure and certain method of deterioration. A farm will be less exhausted by the sale of its produce in the form of beef than in the form of grain, less exhausted in the sale of cream or butter than of milk, etc. The return of the ashes to the soil, whence they have come, is economical, just, necessary.

Unleached ashes are valued for the potash (K_2O), phosphoric acid (P_2O_5), and lime (Ca O.) which they contain. In addition, magnesia (3 per cent.), iron (1.5 per cent.), soda (0.5 per cent.), and sulphuric acid (0.15 per cent.) are found.

Leaching removes the salts which are soluble in water ; these are the potash salts. The leached ashes contain from one to two per cent of potash—all the other ingredients of the fresh ashes remain in about the same proportions. A bushel of fresh ashes averages 48 lbs., of leached ashes 55 lbs. The latter contain more moisture. Two samples of ashes have lately been submitted to me for analysis. The first was a little impure, evidently mixed with sifted coal ashes and perhaps slightly leached. I give the analyses so far as they are of value :

		Potash.	Phosphoric acid.	Lime.	Value per bush.	Value per ton.
					c.	$ c.
1	Guelph ashes	5.43	1.20	36.83	20	8 33
2	London ashes, fresh.	7.15	1.89	37.33	26	10 83

The above values are from reckoning potash at five cents per lb., phosphoric acid at 5 cents per lb., and lime at one-fourth of a cent per lb., the same values that are used in all commercial fertilizers.

For further reference I shall give a few late analyses from other sources :

		Potash.	Phosphoric acid.	Lime.	Value per bush.	Value per ton.
					c.	$ c.
3	Canada ashes—New Jersey report	5.02	1.56	36.10	21	8 80
4	Canada ashes—Mass. report (average)	5.76	2.51	36.77	19	8 11
5	Dried hardwood, fresh—Michigan report	11.25	6.00	40.00	48	20 00
6	Dried hardwood, leach—Michigan report	1.60	6.80	42.00	25	10 40
7	Canada unleached ashes—New Jersey report	6.25	1.87	37.24	24	9 98
8	Hard coal ashes—Michigan report	0.10	0.05	1.50	00	0 16

The more complete analysis of ashes No. 2 I found to be as follows. It may be taken as a fair average of fresh ashes :

Water	2.07	per cent.
Insoluble matters	7.68	"
Potash	7.15	"
Phosphoric acid	1.89	"
Lime	37.33	"
Magnesia	3.02	"
Iron and alumina	1.53	"

Practical Conclusions.

1. Ashes are very beneficial to all soils more or less impoverished, especially to sandy soils.

2. Ashes are adapted to every crop of a woody nature, especially fruit trees and vines.

3. Hardwood ashes are worth to the farmer unleached about 20 cents per bushel, leached about ten cents per bushel. Softwood ashes are a little less valuable.

4. Coal ashes contain little or no plant food. They are a good absorbent, make first-rate road beds, and are well adapted for filling in hollow walls.

5. Apply from one-half to one ton of fresh ashes per acre, three to four tons of leached ashes.

6. All wood ashes should be kept under cover, in a dry place.

As an addition to the above I may add an analysis of charred bone or "bone char" made by myself, as follows :—

Insoluble matters	5.45
Water	1.38
Iron oxide	1.79
Phosphoric acid	28.50
Magnesia	2 40
Lime	28.28

Soils.

Several samples of soil have been investigated. I quote two, one of red sand from Niagara district, and the other a marl :—

	Sand.	Marl.
Water	1.44	4.07
Insoluble matter	90.71	0 37
Organic matter	2.98	
Oxide of iron and alumina	3.88	3.93
Lime	0.35	50.69
Magnesia	0.07	0.52
Phosphoric acid	0.32	0.01

The marl sample is valuable solely for its lime. Since analyzing the above I have examined four other samples from different localities. Of all the Ontario marls I have so far examined, none contain phosphoric acid in any considerable quantity; they are valuable solely for their *lime*.

The sand shows what a small percentage of fertile soil is soluble or available material. When we consider the great weight of an acre of such soil, however, we can understand how it is possible for crops to develop in a soil almost wholly insoluble.

Dairy Products.

As the analyses of milk, etc., were part of experiments conducted in other departments, and are doubtless quoted there, I shall not quote them. One interesting case, however, from an outside source, came under my notice. Two samples of butter, salted and unsalted, and a sample of cream from which the butter was made, were sent from a creamery. The objection to them was that the butter soon lost flavour and degenerated. A partial analysis shewed as follows. Side by side I give Kœnig's average of 89 analyses of genuine butter :—

	Unsalted Sample.	Kœnig's Average.
Fat	72.23	83.11
Water	14.77	14.14
Casein—Curd	12.75	0.86
Lactose—Sugar		0.70
Ash	0.25	1.19

The fault was that the butter contained too much curd, approached too nearly to cream cheese in composition, which it somewhat resembled in appearance. Genuine butter should not fall below 80% in fat. The presence of curd would hasten decomposition and the imparting of a rank flavour and odor.

The presence of the curd was very apparent on melting the butter. A simple test for curd in butter is to place some of the butter in a test tube or tall glass; stand this in a dish of warm water and allow the butter to melt. The curd is seen floating in the clear fat or oil.

Water, etc.

Several samples of well water and other substances have been examined during the year and been reported upon. This department of the work has been steadily increasing for the past year and a half, and with the increased accommodation will, doubtless, still further increase. Having lectures to prepare and deliver to students of three different years and practical instruction at least three afternoons every week, it is easily seen that I have not much time left for investigation outside of my regular work. So far as I can I answer all such enquiries, and trust that any delay sometimes resulting will not be set down to negligence. The work now resting upon the chemical department precludes all possibility of its being considered a sinecure. With new equipment and increased accommodation, however, this is not the time for complaint.

Trusting this will meet with your approval,

I remain,

Your obedient servant,

C. C. JAMES,

Professor of Chemistry.

PART IV.

REPORT OF THE

PROFESSOR OF VETERINARY SCIENCE.

GUELPH, December 31st, 1887.

To the President of Ontario Agricultural College:

SIR,—Unlike my report of last year, it is my duty in this year's one to explain a somewhat heavy loss, from the death of some valuable animals.

Although it sounds somewhat paradoxical, after the above statement, I may say that the general health of the live stock on the farm has been good; for we have had comparatively few casualties of a mild type.

Unfortunately, some of the diseases have been of that class usually included amongst the malignant. About the only disease of the urinary organs that I meet with in my private practice, or at the College, among sheep, is what is technically called

URETHRAL CALCULUS,

or the presence of stone in the tube leading from the bladder to the end of the penis.

I have seen it both in wethers and rams. Sheep are naturally predisposed to this trouble, both on account of the small size of the urethra and the existence of the peculiar worm-like appendix at the end of this tube, commonly called the feeler, as the sediment from the urine would be much more likely to clog, under these conditions than in the horse, in which animal the urethra is comparatively straight and large in calibre.

The stone is sometimes lodged above the S-shaped curve in the urethra, but I have generally found it in the feeler, plugging that worm-like tube, so that it is impossible for urine to be voided.

Unfortunately there are seldom, if ever, any symptoms to warn one of approaching danger until complete obstruction is present; and even then, in a large flock, it is easy to overlook a suffering animal for some hours, or until it is too late to give remedial aid.

The symptoms of suffering are not continuous or pronounced until the bladder becomes surcharged with urine, and then rupture of that organ will take place after a few hours.

When rupture has taken place, and the urine has escaped into the abdominal cavity, the evidence of pain is continuous and distressing.

The animal begins to breathe very rapidly, grinds his teeth, and grunts audibly after each expiration of air. After several hurried respirations breathing is suspended for a few moments, to be resumed as rapidly as ever.

It was evidently after rupture had occurred that our attention was drawn to an imported ram that died in the beginning of the year.

On holding a *post mortem* before the students the obstruction was pointed out in the "feeler," and, as was expected, the belly (abdomen) was found full of fluid, and a tear in the bladder. In rams and wethers that show pain, the urethra should always be examined for the presence of an obstruction. If it is in the "feeler" it is hardly possible to remove it without cutting off this appendage, as manipulation tears and bruises it, it being very frail. It is the generally accepted impression that it renders a ram sterile if this appendix is removed. My experience doesn't warrant my giving an opinion as to this; but if it is the case, such an alternative as its removal in a valuable ram is serious, and reduces him to mutton value in the event of a recovery.

If the obstruction is higher up, cutting down on it is the only remedy. In doing this the penis should be pulled out to some extent, so that the incision through the skin and that into the urethra will not be opposite when the penis retracts; thus sufficient closure of the urethral incision will result in order to admit of the urine flowing through its proper channel after removal of the stone. It is caused by undue quantities of the salts of lime and magnesia in the drinking water. High feeding on grain, containing salts, particularly if the supply of water is insufficient, which should be soft water if the supply of hard water contains too much lime.

Parturient Apoplexy.

This affection is sometimes, but erroneously, termed "Milk Fever." Another much more appropriate term is used to designate it, viz.,—"Dropping after Calving," which is more significant, as it indicates the fact that the malady occurs soon after calving, and that its characteristic sign is loss of ability to stand.

But the real nature of the trouble consists in a congested state of the blood vessels of the brain, with effusion from them, which presses on the brain matter and impairs its function of providing the muscles with nervous influence, and thus giving them ability to contract, which ability enables an animal to stand and move.

This supply of nervous influence being cut off through the apopletic condition of the brain, and possibly of the spinal cord also, the voluntary muscles become flaccid and the animal paralysed.

There is no affection of common occurrence in the cow that is so fatal. Veternarians are unanimous in asserting that four cases out of five terminate fatally.

It is not only the primary trouble that has to be contended with, but there are a number of sequels which, under the circumstances, prove even more obstinate to control than the primary condition in connection with the brain.

A marked symptom of the disease is the profound state of stupor, or coma, into which the animal sinks. She becomes so insensitive that the finger can be run against the eye without causing any resistance.

Now in some cases this lethargic condition passes off, and the subject may even gain control of its muscles and rise, but in some other instances paralysis remains obstinately.

Inflammation of the lungs and bronchitis frequently follow; very often the result of pouring down medicine, as the animal is unable to swallow, and the liquid passes down the wind-pipe into the lungs, there setting up inflammation of a serious character.

This would be serious at any time, but occurring after the nervous system has become depleted by disease, it leaves very little chance for recovery.

Another result of the nervous derangement is that digestion is suspended, very palpable evidence of which is shown, sometimes, by attacks of bloating. But abdominal pain is sometimes manifested by great uneasiness, grunting, frequent breathing, escape of a small quantity of liquid fæces, and progressive exhaustion resulting in death; when a *post mortem* reveals nothing to account for it but a very full and impacted "many-plies," with evidence of inflammatory action, in the third and fourth stomachs.

An imported Jersey cow sickened some twelve hours after calving, with parturient apoplexy. The coma disappeared in about twenty-four hours, during which time ice was kept on the head, the patient was kept in a comfortable position, and the action of the skin encouraged by warm blanketing. It was during the intensely warm weather of July, but the case appeared a most encouraging one, for the cow regained consciousness and partial control of her limbs; but she gradually sank, having shown evidence of much pain and exhaustion, which we were unable to overcome by the liberal use of anodyne and stimulants. A *post mortem* showed exactly the condition already described in connection with the third stomach. A purgative of Epsom salts was given her at the onset. No evidence of irritation of the bowels was noticeable *post mortem*, so that the abdominal pain could not reasonably be referred to intestinal derangement. This cow was in fair flesh, but had nothing to eat except what she picked up at pasture.

Tuberculor Consumption.

I have further to report two cases of tubercular consumption, one occurring in a Polled Angus bull, and the other in a Polled Angus cow; both, of course, terminated fatally. My attention was not drawn to the bull until a few weeks previous to his death. The herdsman had noticed that he was not quite so thrifty as he had been for a few months, but thought there was nothing of any importance wrong, as he had no cough and ate fairly well. Towards the autumn the failing condition was more apparent, and it was thought better to turn him out, as it was imagined that his long confinement in his box was perhaps the cause. But after being out some three or four weeks he came up looking almost like a skeleton, and continued to fail very rapidly until his death, which occurred in a couple of weeks.

The cow had proved barren for a number of months, although she had been served regularly every time she came in heat. It was thought advisable to send her away to another bull, and she remained away some months. She was in good condition when she went away, but on her return presented a very emaciated appearance; in fact, her case was a typical one of tuberculosis.

In addition to a very low state of flesh, she coughed frequently, breathed somewhat rapidly, had very little appetite, and suffered from diarrhœa occasionally, the discharge having a very offensive odour. Her skin presented a dirty, scurvy, dry appearance. She gradually became weaker, until she was unstable in her movements, and at last hardly able to rise from the recumbent position, when it was thought more humane to destroy her and hold an examination for the benefit of the students.

More extensive deposits it would hardly be possible to find. The lung tissue itself was not very much involved, but in the covering of the lungs—pleura—there was a very extensive deposit. The liver was fully three times its normal size, having immense deposits in it. In the membrane that covers the bowels, and attaches one portion of them to another, etc., were numerous and large masses of confluent tubercles or tumours containing considerable quantities of curdy matter.

One ovary and a horn of the womb was also extensively involved, which accounts for the animal not conceiving.

I have in former reports endeavoured to explain the nature, etc., of this disease, so it will not be necessary to go into any further details.

I may say, since my connection with the College, that we have been very unfortunate with Polled Angus cattle, in the way of having some half-dozen victims of tuberculosis amongst them, while we have had three amongst the Durhams, or Durham grades, one Devon, one Ayrshire, and one Hereford.

Comments have been made upon the number of cases, reported in former years, of tuberculosis at the Experimental Farm.

To a breeder of ordinary grades it may seem somewhat strange, for it must be admitted that this scourge is comparatively rare amongst the unimproved breeds.

Some raisers of pure-bred cattle who are fortunate enough to possess strains that are untainted, or whose range of experience is small amongst pure-breds, would naturally be astonished at the fatality we have experienced.

But one who gets a look behind the scenes, occasionally, at what transpires amongst some of the valuable herds of this country, will realize that the Experimental Farm does not occupy a peculiar position with regard to the occurrence of tuberculosis.

Rather a remarkable case occurred in connection with the Guernsey bull. A casual observer would certainy have thought that he was a victim of tuberculosis, for during last winter he kept getting thinner and thinner, until he presented a most emaciated appearance by the spring.

I was frequently asked to do something for him, but could never determine the presence of any organic or even functional disease unless mal-nutrition be classed under the latter head, or also impaired appetite.

He is a very nervons and excitable animal, and appeared to chafe under the enforced restraint of prolonged confinement in a box stall, although for a couple of years he had done very well there. I suggested turning him out to pasture with a cow, and the freedom had a magical effect in restoring his appetite and improving his condition, so that when he was taken up again he had regained most of his former condition, and has remained thrifty since

Spaying.

In my last year's report I promised to be in a position to give an account, this year, of some systematic experiments with regard to the effects of spaying on the production of milk.

Unfortunately a change took place in the management of the creamery last spring, and I was unable to gain permission to institute any such experiment, but I am promised an opportunity next spring to do so.

As was explained in last year's report, two heifers and two cows were spayed, chiefly with the object of testing how they would stand the operation. Its effect upon them was then explained. The heifers are thriving wonderfully well, and show by the progress they are making a marked advantage over the unspayed ones that stand beside them, and which lose considerably by their fretfulness and loss of appetite during the twenty-four or forty-eight hours they are in heat every three weeks.

I think there can be no question that when heifers are intended for the block spaying is a great gain ; in fact, this may be considered established, by the practice having become very general in grazing countries.

Of course it is of greater benefit in large herds where no attempt is made at housing, and where rutting heifers cannot be separated from the rest of the herd, as in some ranches.

It was explained in last year's report that we were unfortunate with one of the milking cows that was altered.

She was a bad subject, as she was suffering from a sore teat that became blind before she was operated upon, and the remainder of the quarters were subsequently lost, so that she was fattened and sold.

The other cow is still milking pretty freely, and it is now about twenty months since she calved. She is giving about twenty pounds of milk per day, and has varied very little from that amount during the last year.

Respectfully submitted,

F. C. GRENSIDE, V.S.

PART V.

REPORT OF

THE PROFESSOR OF AGRICULTURE,

FARM MANAGER, AND EXPERIMENTAL SUPERINTENDENT.

ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM,
31st December, 1887.

To the President:

SIR,—I beg to submit my reports upon the Farm, the Live Stock, the Experimental and the Mechanical Departments of this Institution for the year 1887. Following the practice in previous years of giving, in an introduction, some material directly connected with our work here, I make no excuse in offering notes on the correspondence of my departments, as they cannot fail in showing how our arms are extending and what is expected of us year by year.

My annual correspondence is in the neighbourhood of 2,000 letters, thus averaging seven letters per day. Of these, one-third is from all parts of Canada, asking for advice in regard to some speciality in farming, and particularly as to adaptability of live stock. Many ask so much as to necessitate referring them to a text book. One of the most interesting of my lines of correspondence is with ex-students, who hold me in keeping with their progress in the world. I find a large proportion of our associates, that is our A 1 men, have not forsaken the profession. Taking those up to 1886 inclusive, the following gives a close idea of what they are doing:

Farming in Canada		56
Farming in United States		3
Veterinary profession		8
Professor of Agriculture		1
Nurseryman		1
Farm managers for others		2
Preparing as Experts in Agriculture		7
		78
Medicals	3	
Commercial pursuits	5	
The Church	1	
Bankers	2	
In Europe	3	
Not known at present	25	
		39
Total Associates		117

Of these, 33 are non-residents of Ontario, and outsiders hold 5 of the 17 medals that have been given during the twelve years. In connection with this subject, I am much gratified at the arrangements of a third year's course for those who desire either to make a speciality of one branch, or to extend their general knowledge with us. The appliances in chemistry especially should enable us to make experts for the profession, and I respectfully submit that we should not delay in letting it be known that the Ontario Agricultural College is preparing young men for other Colleges and Experimental Stations.

The issue of Bulletins has added considerably to my correspondence, not alone among our own people, but as nearly every agricultural journal of the States and Britain give these brief notes a good place, explanations and further information are often called for.

This brings up the subject of experimentation, and as I anticipated in reporting last year, we have calls for a reprint of the most important of our work in this direction. These were summarised in my 1886 report, and I again beg to draw the attention of the Commissioner to the importance of this proposal. It was no spurious notice in the public press recently that an American agricultural journal had asked for 20,000 copies of our Annual Report for distribution among its subscribers. The letter was sent to the Commissioner, and I have authority to name if necessary. As further evidence of the general good feeling towards our labours, I am in regular gratuitous receipt of the following papers —in addition to those sent the Librarian: *N. B. Agriculturist*, Scotland; *Bell's Weekly Messenger*, England; *Farm and Home*, Mass., U. S.; *The Jersey Bulletin*, Ind., U. S.; *National Live Stock Journal*, Chicago; *Breeder's Gazette*, Chicago; *The Farmer*, St. Paul; and *Hoard's Dairyman*, Wis. I take and appreciate the compliment most highly for all concerned.

I am as much as ever kept up to time in regard to any new varieties of wheat and oats that may come under our experience. On this valuable question I have reported in these pages with my assistant, Mr. Zavitz, and all needed to be said now is that, even though Provincial only in our immediate interests, and not demanding so much attention as a Dominion does, we should keep up a full practical enquiry about better cereals for Ontario.

Having taken particular interest in the undeveloped pasture lands of Canada, many enquiries are made about sheep grazing—particularly in the N. W. Territory and the Eastern Provinces. I am prepared to reply fairly well as to the latter, but not having been west, am unable to place the country, even to our students, as a teacher ought to be able to do.

It is known I took an interest in the experiment of shipping store cattle to Aberdeen, Scotland. The report of the three cargoes sent to date is not highly satisfactory financially. I understand that the importing company does not ask for an immediate selling profit, and would be satisfied were a simple clearance made—desiring only to put the country in possession of some good stores that will keep up the long standing of Aberdeen for finished beef. I ask, then, that no prejudgment be made, but to wait until next year's market tells of weight and quality on the London shambles, when also, may be, better shipping facilities will settle the question of Canadian stores for Britain.

As representing Ontario, I had the honour of judging live stock at the Quebec Dominion Exhibition this year, where I gathered information of considerable importance to myself as a teacher, and to others, I trust, as time may allow me to develope some points of interprovincial interest. On the question of judging at such exhibitions, I beg to give herewith a plan and explanation of what I have adopted for private use, or when I am asked to act as sole judge of one or all classes of live stock as I did at Barrie, last year.

BARRIE AGRICULTURAL SOCIETY.

SUMMARY OF CATTLE JUDGING.

Class 2. Section 3. October 6, 1886.

	Prominently or Moderately.				Remarks.
	Superior in		Deficient in		
	1	2	1	2	
Animal numbers	P. S.	M. S.			
Head and neck	M. S.	M. S.			
Fore quarters			M. D.	M. D.	
Barrel, including crops and loins		P. S.	M. D.		No. 2 broader and fuller
Hind quarters, including flank and twist	M. S.			P. D.	
Legs, including arms and thighs	P. S.	M. S.			
Size, according to age	P. S.	M. S.			No. 1 very sup'rior skin
Quality (hair, skin, flesh, and bone)	M. S.	M. S.			No. 1 somewhat better.
Character	P. S.	M. S.			No. 1 very superior.
Markings	M. S.	M. S.			
Milking indications					

Explanations.—P. S.=10, M. S.=8, M. D.=5, P. D.=3. Maximum value, 100.
Awarded No. 1=82, first prize; No. 2=74, second prize.

I am much in favour of the one-judge system once we have experts enough for each class or breed. In addition, I said a few words to the public in closing the judging of some of the more special prizes, while animals were in the ring, giving reasons for preferences. I think every competitor is entitled to an abstract report upon his animals.

I am not yet clear as to using a scale of points with a view only for points. I think we want to express or explain the valuation of a point by some words such as I have used in the foregong form.

In the case where I used the card I had only two cows (Jerseys) in competition. This plan has only ten divisions or points for any animal of any breed, and each of these divisions or points is subject to four valuations, viz.: "Prominently Superior" (P. S.), or "Moderately Superior" (M. S.), and "Prominently Deficient" (P. D.), or "Moderately Deficient" (M. D.) Each of these points has a fixed valuation, as will be seen by the card, the maximum value being 100. I find it easier and more natural to judge and speak of points by a name than by a number, as in the usual scale of points, and I think the four names used here meet all. I systematically go over each animal by the ten abstract points named, putting down the inital letters only, and then give the letters their value in figures afterwards. It takes about five minutes to each animal. With this explanation a brief study of the plan will make it clear.

Is Ontario—I should say Canada, properly—to remain much longer unrepresented by *practical work in Arboriculture?* We have surely talked and written enough on the subject; delay now will be more than dangerous; it will reasonably be called national suicide.

I am not satisfied that our own institution is doing all it could or should in respect of matters within its own lines. On 28th July last I drew your attention to the value that may be given the Province by enquiries through the winter action of the faculty here, with reference to several scientific and practical subjects effecting the farming of the Province.

We have, to some extent, thrown light upon some of them, but not full enough to be of direct public benefit.

Many enquiries have been made in regard to creamery work here and over the Province; men want facts not yet gathered in their own experience, and many desire a full account of the whole business. In the absence of a special professor of dairying, —now, however, again well filled by Professor Robertson—I have done my best to meet this demand, and have even issued a bulletin on one of the butter making problems of the time.

II.—THE FARM.

It is year by year growing more difficult to say much new about farm work, and as Mr. Story has entered pretty fully into details of the year's operations as given herewith, I shall confine myself to some notes on the yield of crops during the last twelve years.

Crop.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
W. Wheat	.....	.....	22	21	27	.....	38	15	24	36	24	.....
S. Wheat	10	18	13	20	18	18	23	21	.....	.....	.....	.....
Barley	30	35	27	36	26	23	30	35	42	40	42	27
Oats	39	38	49	36	17	34	41	55	40	42	50	30
Peas	32	25	31	27	27	23	35	22	35	22	35	30
Hay	1.35	1.30	2.40	1.60	2.20	1.25	1.42	2.50	1.75	1.81	1.85	1.75
Mangolds	350	770	1,030	718	790	1,006	1,000	650	953	1,020	795	450
Turnips	553	760	550	630	725	390	700	450	775	900	700	510
Carrots	270	.....	910	315	580	.....	800	500	900	750	450	500
Potatoes	110	150	250	77	126	190	103	100	202	174	170	80
Corn fodder	25	27	35	13	.....	.....	25	20	.....	40	20	15

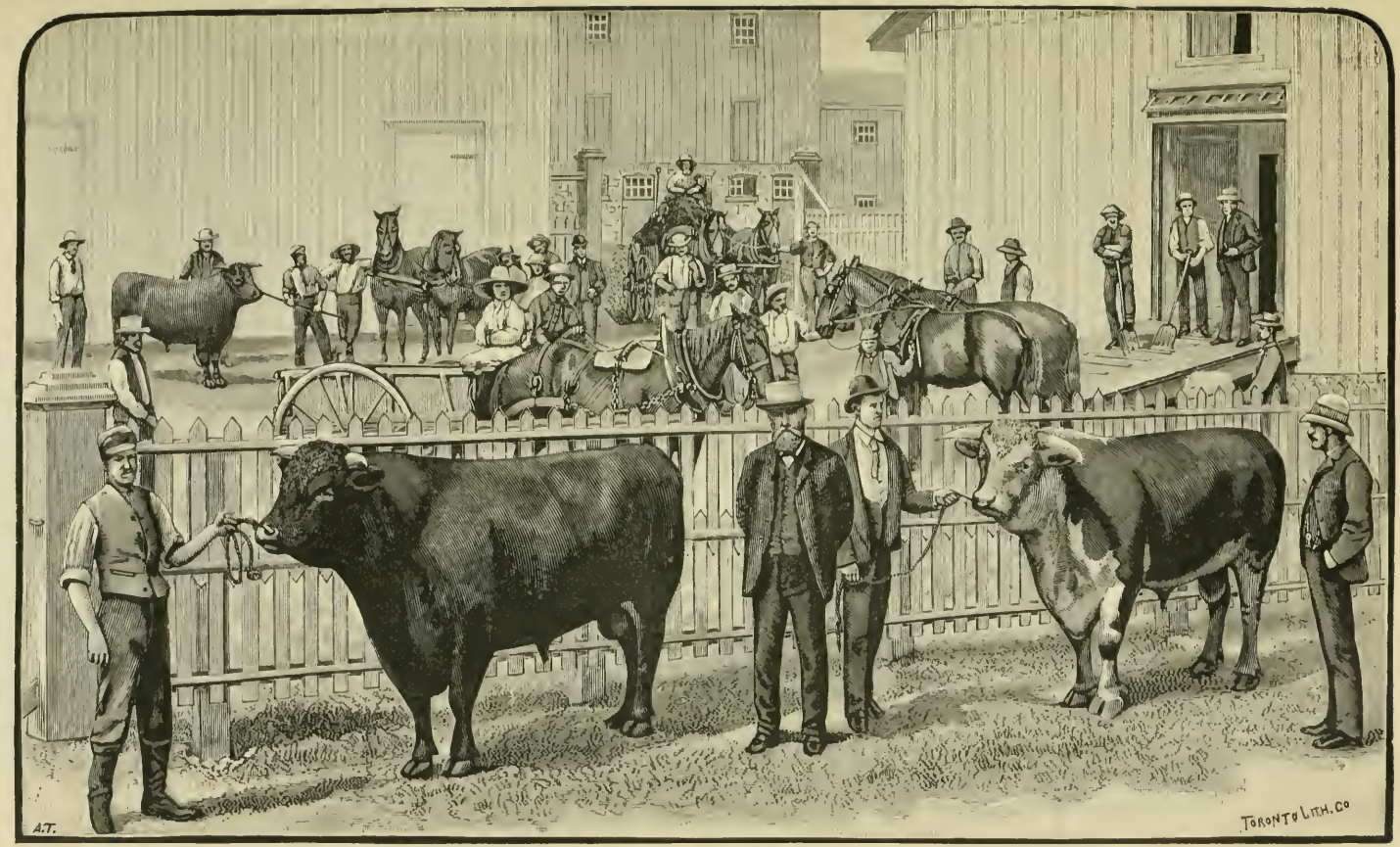
Grain and roots in bushels; hay and corn fodder in tons.

Not having any other reliable returns for comparison, and as it is necessary to compare with something, I have pleasure in using the five years of the Ontario Bureau of Industries from 1882 to 1886.

	Ontario.	O. E. Farm.
Winter Wheat	22	27
Spring Wheat	17	17
Barley	28	32
Oats	35	40
Peas	22	29
Hay	1.41	1.75
Mangolds	462	797
Turnips	420	635
Carrots	385	595
Potatoes	125	144

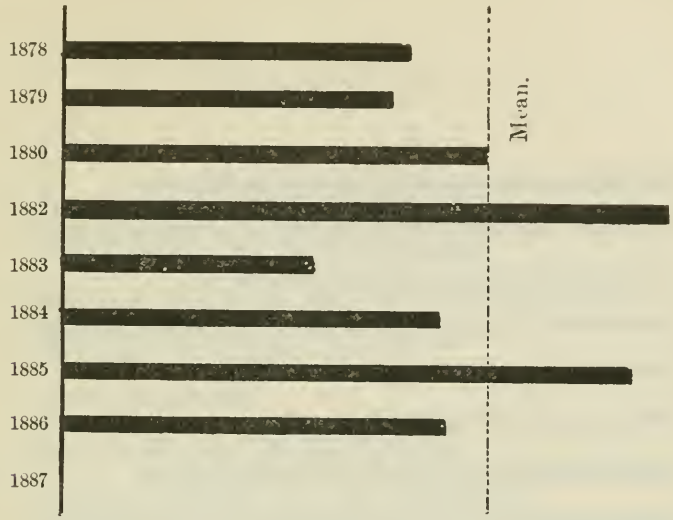
When twenty-two bushels is the average of winter wheat for the Province, our five bushels more shows we are not prominent in that respect, and possibly the 850 feet above Lake Ontario is the principal regulator. The fact also of our seventeen bushels of spring wheat representing exactly the mean of the Province is ample evidence that this district is not a leader in wheat per acre. In other grain our position is better; in barley we have made fourteen per cent. more, in oats also fourteen per cent. more, and in peas twenty-two per cent. over the mean of the Province. The cropping character of our district is, however, very clearly marked in root products. We as a farm have harvested seventy-five per cent. more mangolds than the Provincial average, and actually double in turnips and carrots. In potatoes our mean is about thirteen, and a fourteen per cent. better product in hay.

In order to more fully impress our twelve years' cropping, I beg to give a diagram of each for every year, with a brief note.



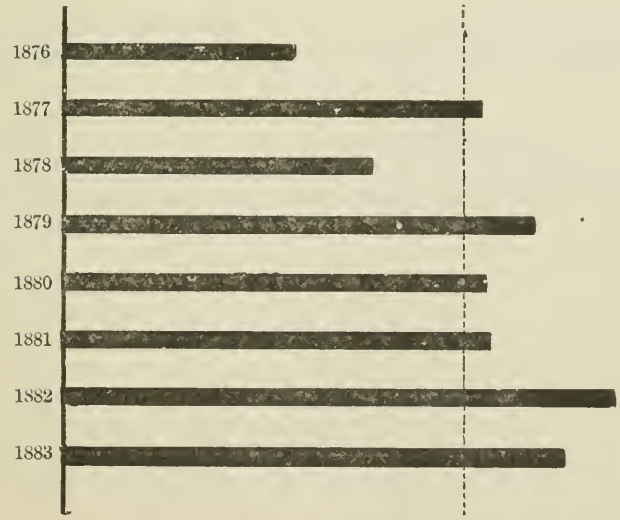
Morning Scene at Barnyard before going out to Work, Agricultural Farm, Guelph.

Winter Wheat at the Ontario Experimental Farm, 1878 to 1887.



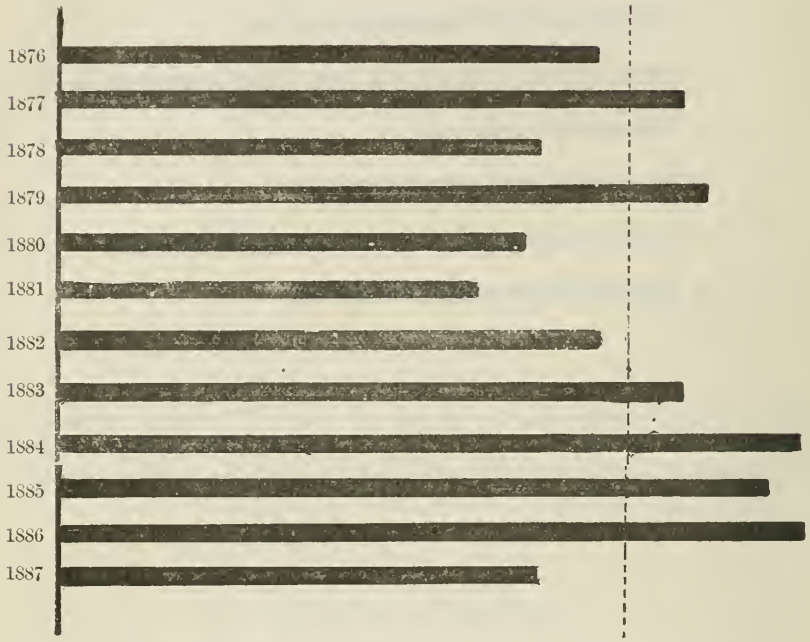
In winter wheat we have had an average of nearly 27 bushels per acre with two distinct over averages in 1882 and 1885, and a very low yield in 1883. These may be called our guides to winter weather, and specially irregular weather in autumn and spring.

Spring Wheat, 1876 to 1887.



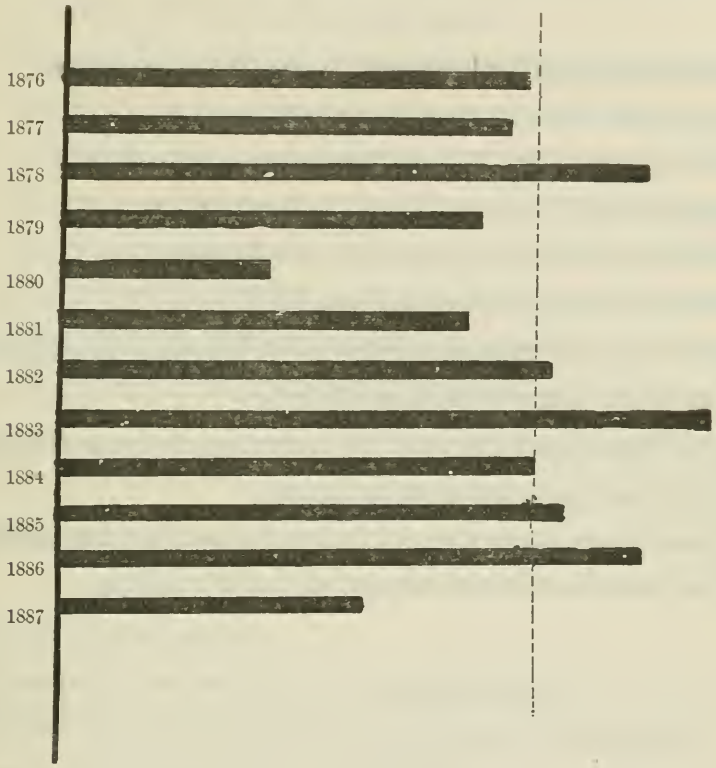
Our spring wheat has averaged 17 bushels with but two underaverages up to 1883, inclusive, which marks our departure from this crop meantime, in consequence of blight and rust. Spring wheat may be termed the test of moist warm weather during July.

Barley, 1876 to 1887.



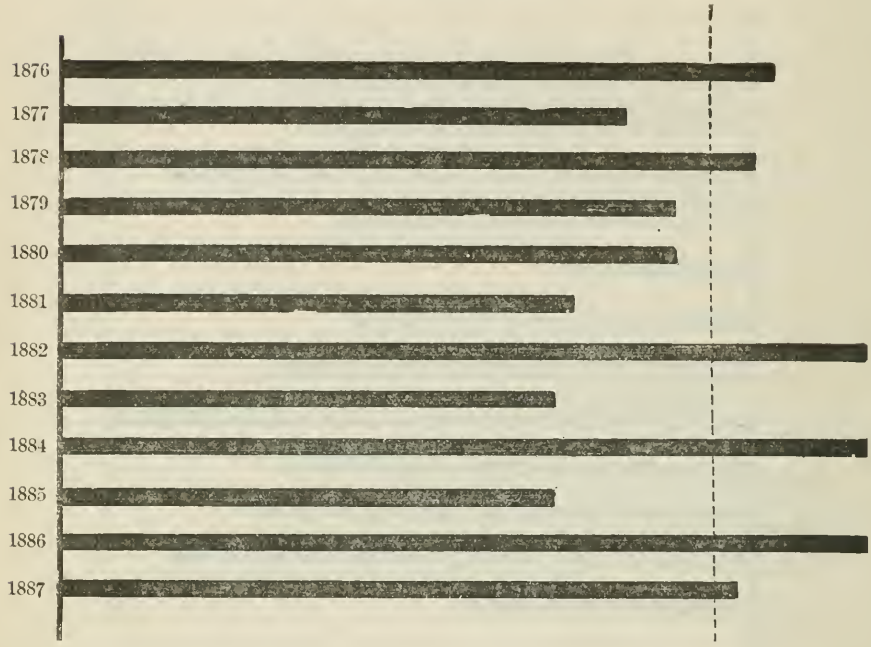
With an average of 32 bushels we have had a very steady experience in barley—low years only of 1880 and 1881. A good crop of barley tells of a good deal of moisture and medium temperature.

Oats, 1876 to 1887.



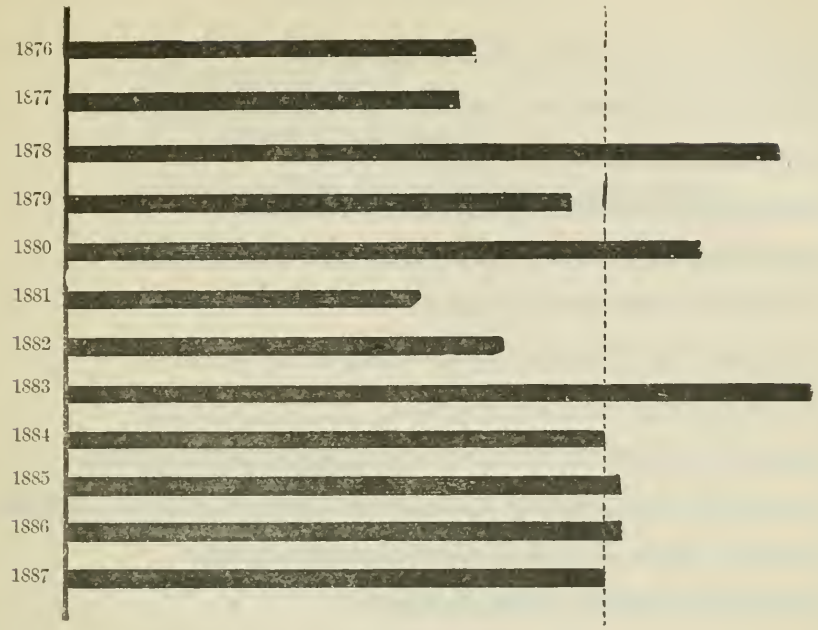
Forty bushels of oats per acre is not a very large yield, and in our conditions has meant more straw than wanted; there have been only two prominent under averages, 1880 and 1887, and hence all over could Ontario check straw growth this crop would easily reach a mean of 50 bushels per acre. Much rain and propitious soil do not give grain.

Peas, 1876 to 1877.



This crop has averaged 29 bushels with us, and a mean of over and under averages. The weevil trouble is marked from 1879 to 1883, but possibly no grain has been so reliable under varying conditions. Observe that even during the great drought of 1887 we had a full average. The pea has always been a good rustler here.

Hay, 1876 to 1887.



The fodder of Canada has been an average of one and three-quarter tons per acre here. Observe the steadiness of the crop all through, the year 1881 only being down to one and one-quarter ton. No crop speaks so much of good winter and summer conditions as this does, and hence a criterion for other countries.

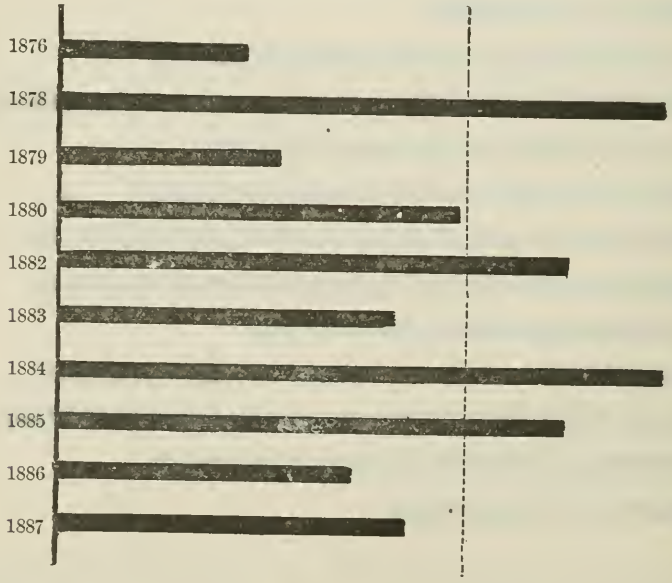
Mangolds, from 1876 to 1887.

Seven hundred and ninety-five bushels, or twenty-four tons of mangolds per acre, implies good things both in climate, soil and management. Possibly of all root crops this is the most reliable and least patronized in Canada.

Turnips (Swede), 1876 to 1887.

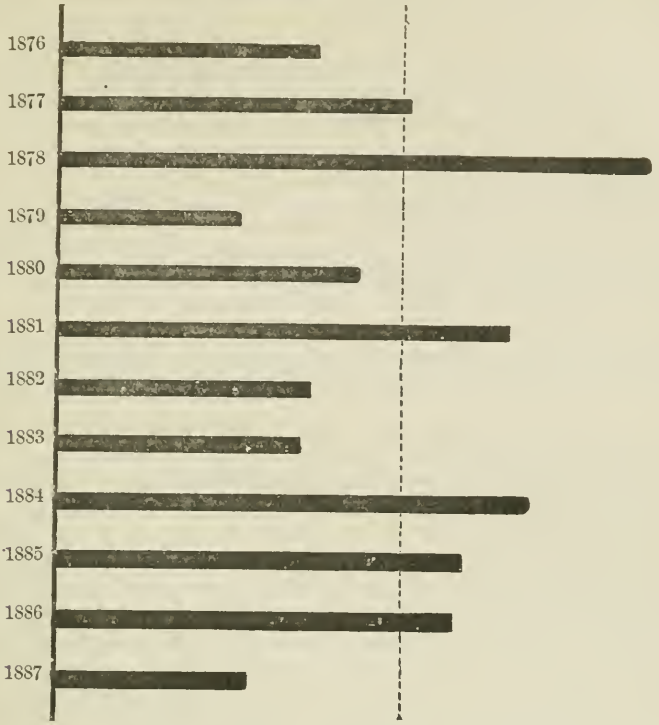
Nineteen tons (635 bushels) of Swede turnips per acre, over twelve years from a mean of twenty acres annually, is a handsome return, under the difficulties of fly and drought. A good crop here always speaks of plenty rain and an under average temperature.

Carrots, 1876 to 1887.



We have had more extremes in carrot crops than other roots; as the above average line represents 595 bushels per acre, the irregularity is easily noted.

Potatoes, 1876 to 1887.



An average of 144 bushels potatoes. I think our rainfall is better represented here than by any other crop.

Report of Farm Foreman.

Prof. Brown,

Sir,—I have the honour to present herewith to you my first report upon the Farm and Live Stock Department, for that part of the past year in which they have been under my supervision.

As I did not come here until July 1st, I am unable to give an account of the spring or early summer's work, sufficient data for such not being available. And it is difficult for me to say whether or not these branches of this institution were up to the standard.

The instruction of the students in practical agriculture has been steadily kept up, and much material benefit has been derived from it by such of the students who had not the opportunity previously. All are required to come under the instructor's charge in rotation, and are taught ploughing, harrowing, hand sowing, mowing with the scythe, raking and curing hay, binding by hand, and in fact all general farm work.

I regret to say that we have not at present a very effective methed of imparting this knowledge, as we keep just enough horses to work the farm. We cannot at any time spare a team long enough to give each student a chance to become familiar with the management of horses. This is particularly needful to those students coming from cities, and in our short time suitable for ploughing we can barely give each a good lesson.

In the Live Stock Department matters are more favourable ; here the student is taught the best ways of rearing and the general management of farm stock.

I would here call your attention to a matter of importance regarding the instruction of students on live stock.

The student who does not feel inclined to come out at six in the morning to assist with feeding and cleaning cattle is allowed to find a substitute, and I find in general it is students who have never been accustomed to farm work who send substitutes. The students who continue to come out soon become fairly well posted upon the valuable points in the various breeds by contact with them through handling.

Since the completion of our engine-house and its accessories we are able to give instructions in the management of the engine, grain chopper, straw cutter, root pulper, threshing machine, and in the making and management of our pulp, consisting of straw, hay, roots and bran.

Our new barns are giving much satisfaction, with the exception of a slight irregularity in connection with the cattle stalls. They are about fifteen inches too short, which not only makes it uncomfortable for the animals lying down, but causes a great waste of bedding unavoidable, and consequemtly we are liable to run short towards spring, rendering a purchase necessary. I had hoped this would be remedied before winter, but, as it is not done, we will have to bear with it another season.

The rack-lifter put in the barn by Mr. Armstrong, of Brampton, has given entire satisfaction all through, and, I must say, saved a great deal of time and labour in filling the barn.

On the farm proper improvements have been steadily going on. We have done considerable underdraining in Fields Nos. 1, 2 and 4. In No. 1, a drain 109 rods in length was opened by contract, and the tiles laid and filling done by farm hands and students; in No. 2, a drain 104 rods long, with tiles 6 in. was opened, and tiles laid by contract, the filling-in done by farm hands; in No. 4, a drain 45 rods long was opened and tiles laid by contract, and filling done by farm hands and students. In these three drains nothing was used but 6-inch tiles. We also spent a great deal of labour in stoning fields 3 and 19. The grading of the centre lane, running north-east and south-west, was commenced. It is not yet complete, but, when it is, will be a grand improvement upon the old road.

Although the working force on the farm has been considerably diminished, yet we had to put some student labor and farm help in making improvements, while direct farm work suffered.

Several great changes have been made in the positions of the minor farm buildings. The experimental barn was moved eastward, and is now being used as a waggon shed. The implement shed was removed to the same frontage as the main barn, and is to serve its former purpose. The old engine-house was removed to the north-east side of the mechanical foreman's shop, and will be used as a lumber house. The farm foreman's stable was removed eastward across the lane, partly on the experimental plots of No. 14, where it will be used as a protection to the farm scales. The mechanical foreman's shop was then moved down abreast the others, making quite a formidable array of structures.

The past summer was one of exceptional hardships to vegetation.

From the 21st of June until the 5th of August no rain fell, and, in general, the heat was intense. Notwithstanding these disadvantages, an average crop of everything was secured, with hardly an exception. The hay, which was near maturity when the drought set in was a good crop, but the roots and grain were more or less affected.

During midsummer the root crop looked far from promising, but toward the latter part of the season they, in a large degree, made up for lost time, and a crop of fair size was gathered. I regret to say that, owing to excessive heat and drought, our catch of grasses and clovers was very slight, which will upset our arrangement for spring work considerably.

The cropping of the various fields of the farm was as follows:—

No. 1 Field.—Nineteen acres; in hay, which gave about $1\frac{3}{4}$ tons per acre.

No. 2 Field.—Seventeen acres; this field was broken from sod early in June, was worked as bare fallow, cultivated with gang ploughs in July, and the last ploughing was given during the latter part of August, between the 3rd and 7th of September, ten acres of it were sown with winter wheat of three varieties, namely, three acres Democrat, three

acres Bonnell, and four of Clawson. The remaining seven acres we calculate to plant with potatoes in spring.

No. 3 Field.—Seventeen acres; five acres of this field have been given over for experimental purposes, and the gravelly knoll on north side of four acres was this year converted into a plantation. The balance of eight acres was sown to barley, yielding 27 bushels

No. 4 Field.—Twenty acres; ten in natural pasture and ten in winter wheat; seven acres of the former was broken up by the Horticultural Department, and balance used as a paddock for pigs and cattle.

No. 5 Field.—Twenty acres; ten in bush and ten in winter wheat, which promised well until about 7th July when it was smitten by a heavy rust which lessened its yield very much.

No. 6 Field.—Twenty acres; twelve acres of turnips, giving about 510 bushels per acre; four acres of mangolds, from which we obtained about 450 bushels per acre; and one acre of white Belgian carrots yielding about 500 bushels per acre; three acres white Australian Oats, yielded 35 bushels.

No. 7 Field.—Seventeen acres; all hay, producing about 2½ tons per acre.

No. 8 Field.—Twenty acres; all sown with white Australian oats, which yielded 32 bushels per acre.

No. 9 Field.—Twenty acres; all sown with Mensury barley, and seeded to timothy and clover, which, owing to the dry hot season, was completely killed out; yielded 30 bushels per acre.

No. 10 Field.—Twenty acres; ten acres sown with white Australian oats: the balance is taken up by the Orchard of the Fruit Growers Association, and the College Creamery.

No. 11 Field.—Twenty-three acres; hay, giving two tons per acre.

No. 12 Field.—Twenty-three acres; this field has been natural pasture until this fall when a great amount of labour was spent on it in cutting brush, stumping, filling drains which were cut last season, hauling off stones, and ploughing. Owing to the pressure of other improvements we have been unable to get it fenced; otherwise it is ready for seeding in spring.

No. 13 Field.—Twenty acres; all hay, which yielded about 1¼ tons per acre, but owing to a great part of it being killed out by ice or the spring freshet, it was given to weeds, so we were obliged to plough up after taking off hay.

No. 14 Field.—Twenty-four acres; this is the experimental field proper, 17 acres being divided into small plots for purposes of experimentation; four acres were in potatoes which yielded 80 bushels per acre; three acres were sown to corn for green fodder, part of which was fed to the bulls, and the balance put into the soil under experimentation.

No. 15 Field.—Twenty acres; this has been laid down to permanent pasture, and during the drought of the past season maintained its character excellently.

No. 16 Field.—Twenty-five acres; ordinary pasture.

No. 17 Field.—Twenty acres; four acres are taken off this field for a vineyard, under the management of the Horticultural Foreman. The remainder was in hay, which gave about one ton per acre.

No. 18 Field.—Thirteen acres; all hay, that gave about 1¾ tons per acre. This being the third crop of hay in succession, and noticing some foul weeds in the hay, we ploughed it about 20th of August 2½ inches in depth, and immediately passed a heavy land roller over it; toward the middle of September we harrowed it thoroughly, and in the last week of October it was ploughed again 9 inches in depth, and is now in good shape for a crop in spring. The last ploughing was done by those of the students who have had practice before coming here, some of them making really fine work.

No. 19 Field.—Thirty acres; this field was broken from sod last Spring, and 24 acres sown with Golden Vine peas, which yielded 30 bushels per acre; the balance was sown with White Cluster oats, which yielded 20 bushels per acre. Immediately after harvest we put students to stoneing this field, which required a great deal of time. We then put on a dressing of well-rotted farm yard manure, about 15 tons per acre, on the south-east side of the field, which was ploughed under, and on the 4th and 5th of September we sowed it with winter wheat as follows:—five acres Democrat, five acres Bonnell, and six acres Clawson; the balance is prepared for spring crops.

No. 20 Field.—Twenty acres; all bush and uncultivated clearing.

No. 21 Field.—Twelve acres; sown with Mensury barley, which yielded 25 bushels per acre. This field was seeded to clover and timothy which was partly killed in the dry season, consequently we must crop it again next spring.

Implements.—The implements purchased for farm use since 1st July were two Gang ploughs from Bungay Manufacturing Company, Norwich; one wide plough, from Mr. Moore, of Waterloo; wide plough and scuffler, from Thos. Gowdy, of Guelph.

Valuation of Farm Implements, per inventory $2,836 00

I now beg to give the number and value of live stock at this date:—

Inventory and Valuation of Live Stock and Implements on hand December 31st, 1887.

	$ c.	$ c.
Horses:		
9 Working horses on farm	1,400 00	
2 for experiment and instruction	250 00	
		1,650 00
Cattle:		
1 Short Horn bull	1,500 00	
3 " cows	750 00	
1 " heifer	150 00	
		2,400 00
1 Hereford bull	2,000 00	
2 " cows	800 00	
2 " bull calves	350 00	
		3,150 00
1 Galloway bull	300 00	
2 " cows	500 00	
1 " heifer	150 00	
1 " bull calf	100 00	
		1,050 00
2 Polled Angus cows	600 00	
2 " heifer calves	250 00	
1 " steer	50 00	
		900 00
1 Ayrshire bull	200 00	
2 " cows	350 00	
2 " bull calves	160 00	
		710 00
1 Devon bull	200 00	
1 " cow	150 00	
1 " bull calf	100 00	
		450 00
1 Guernsey bull	150 00	
1 " cow	100 00	
		250 00

Cattle—(Continued):	$ c.	$ c.
1 Jersey bull	150 00	
1 " cow	300 00	
2 " heifer calves	200 00	
		650 00
1 Holstein bull	250 00	
2 " cows	300 00	
1 " heifer calf	80 00	
1 " bull calf	150 00	
		780 00
1 West Highland bull	50 00	
		50 00
17 Grade cows	850 00	
1 short horn grade steer, 2 years	175 00	
1 Holstein " steer, 1 year	50 00	
1 Hereford " heifer 1 "	65 00	
1 Short Horn " " 1 "	45 00	
1 Holstein " " 1 "	50 00	
1 Galloway " steer 2 "	100 00	
1 Polled Angus grade calf	10 00	
1 Hereford " "	10 00	
		1,355 00
Swine:		
2 Berkshire sows, 1 year	75 00	
2 young Berkshire sows, 1 year	40 00	
2 Berkshire boars	45 00	
1 Mid. York sow	20 00	
		180 00
Sheep:		
6 Cotswold ewes	120 00	
2 " rams	100 00	
2 " " lambs	20 00	
		240 00
8 Oxford ewes	200 00	
1 " ram lamb	12 00	
3 " ewe lambs	30 00	
		242 00
5 Shrop. ewes	125 00	
1 " ram	250 00	
3 " ram lambs	45 00	
2 " ewe lambs	20 00	
		440 00
4 Southdown ewes	75 00	
1 " ram	30 00	
		105 00
1 Hamp. ewe	20 00	
1 " ewe lamb	15 00	
		35 00
2 Cheviot ewes	40 00	
2 " rams	75 00	
1 " ewe lamb	20 00	
		135 00

Sheep—(Continued):	$ c.	$ c.
4 Leicester ewes	80 00	
1 " ram	30 00	
1 " ewe lamb	15 00	
		125 00
2 Lincoln ewes	50 00	
1 " ram	40 00	
		90 00
2 Merino ewes	20 00	
		20 00
1 Highland ram	20 00	
		20 00
21 grade ewes	126 00	
		126 00
		$15,153 00

I have the honour to be,

J. E. Story,
Farm Foreman.

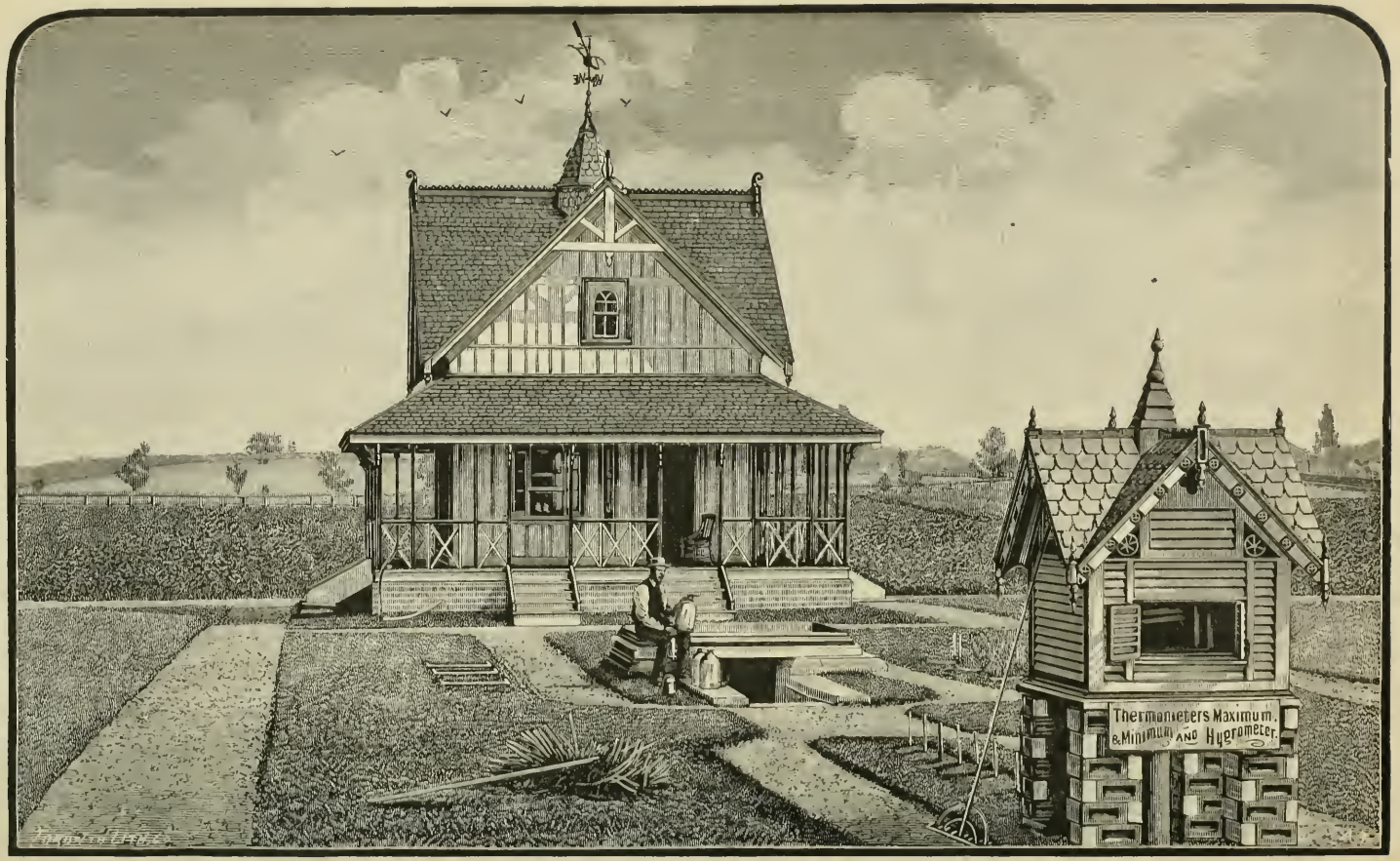
III.—THE LIVE STOCK.

We could add considerably to practical facts in connection with animal life, especially cattle and sheep,—facts in breeding where trouble has been experienced, much more in some breeds than with others under precisely similar conditions; some very interesting things in failures and successes of service, by different methods or plans of it; other facts in the conduct of young animals during milk and afterwards. If time allowed, as it really will not now so well, when we have to leave for Farmer's Institutes, in the beginning of January, we could develop points of utility in sheep life, and would like much to say several things favorably of four year's experience of the Cheviot breed here.

It was considered best to defer the sale of our surplus stock until next year, because most of the cattle were not weaned in September last, and many of the sheep were being improved after a severe culling out. Thus we may anticipate a large and important catalogue for 1888.

Our experience, by correspondence and by personal visits, as to the requirements of the country, as well as the outside market, can be briefly stated. Not one Ontario farmer asked for an Aberdeen Poll, Hereford, or Galloway, though three or four Ontario *breeders* have done so. Several are prepared to offer for all the Short Horn bulls we can put up along with Ayrshire and Holstein. The enquiry is more for bulls than heifers. There is a very decided keener demand for dairy breeds, with here and there—but far apart—a question upon the records of the family as milkers. None ask about a bull for the dairy, that is whether he is likely to be a good getter of *milch* cows. Jersey talk comes from wealthy city men, and a few enterprising experimental farmers, who have used ours this year with their herd of Durham grade cows more than any other of the bulls. Guernseys do not seem to be understood, and even the Devons remain unpatronized. We anticipate some interesting dairy experience with heifers of our own now in calf—first crosses of the Holstein and the Guernsey—with ordinary cows.

In sheep the best demand comes for Shrops, Oxford, Leicester, and South Downs, and in the order named; others are enquired for, but not so prominently. There is a steady



Experimental Station Building, Ontario Agricultural College, Guelph.

feeling for the Downs on the part of those who make a specialty of topping off a couple hundred wether lambs in the fall, upon grain and rape for exportation. Quite a number of our farmers are now doing this; they buy up all the dun, grey and black legs of their class, giving $3.50 a head about 1st September, and sell to shippers in November, often getting $5 to $5.50, and hence making large profits in actual cash as well as in getting up special fields by top dressing.

IV.—THE EXPERIMENTAL.

Our work in this Department has been continued very much in the testing of improved pasture and of food in winter, all in connection with dairying and the maintenance of animal life. I beg to draw attention particularly to the large average facts now held by us with reference to pasture, and therefore the establishment for the Province of what in other countries is looked upon as half their agriculture. It is my special duty to congratulate the station upon the satisfactory closing at present of this testing of grasses in a rotation, and to ask that every facility be allowed in coming years to ascertain how long they will remain in the form usually called permanent.

We have also brought to a close at present the enquiry, by cropping, into the value of several special fertilizers over a course of rotation, in which some features of practical importance are clearly told.

I have pleasure in again introducing the subject of preserving green fodder in winter, the silo and silage. We have ten tons of corn silage on hand for experiments this winter. I am under obligation to Mr. John Gould, of Ohio, for advice and some enthusiastic lessons in this connection, having had the pleasure of his acquaintance during a run at Wisconsin Farmer's Institutes last year. The facts of the chapter herewith on the silo are from him, Mr. Fry, of England, and others; hence should be up to time and of value to our farmers.

Mr. Zavitz, graduate of the O. A. College, and my Assistant in this department, has drawn up the report on new cereals from Europe. I desire to give my special acknowledgments for this gentleman's earnest and most thorough work during the last three years, whether in details of field plots, live stock tests, or in analysis of dairy products, he has proved himself a very capable superintendent.

To Prof. Wm. Brown.

Sir,—I have the honour of submitting the report of experiments with grains during the past season.

In extent and variety they exceed those of former years, the principal work previously undertaken, being with fertilizers, modes of cultivation, etc. In addition to the field used for experimental purposes during the past five seasons, the new plots measured and staked off last autumn in No. 3 field of the farm, have given ample room for testing upon a large scale. The work during this season has not been confined to the growing of our own Ontario varieties only, but has included others from different parts of Germany, England and Scotland. We had hoped also to be able to report on Australian grains, but much delay in shipment caused them to arrive too late for this season, they having been six months on the road. Along with the experiments carried on at this Institution, we are pleased to have for report the results of the work of farmers who have been in co-operation with us this year. In the spring we sent quantities of grain to representative men in different counties, endeavoring to include every portion of the Province. We gave instructions as to sowing and handling of the samples and requested reports of the results. It has been exceedingly gratifying to us to receive so many

complete reports, and our thanks are due to those who have given them. Only those who have been engaged in the details of the work know fully the immense amount of exact and careful labor required in experimentation. Having handled so varied and extensive a crop during the past season, we are in a position to say that the farmer who makes thorough tests is only the man who is fully interested in his profession.

The value of experiments carried on by individual farmers throughout the Province can scarcely be over estimated. No experimental station possesses such a variety of soil and conditions as is found in different portions of the country, hence the work of such a station is of limited value in some lines of experimentation, such as the testing of imported cereals. But when tests, having a uniform plan and system of management, are made upon all varieties of soil and under various conditions, and the results brought together, tabulated, and compared, much valuable information may be accumulated. Last fall, we sent out winter grains for testing to a number of reliable agriculturists, and expect returns of practical worth to report another year.

A valuable feature in this work should not be overlooked, and that is the fact that good grain is being spread over the Province. As an instance of this, we were informed by one of the experimenters that the produce of one of the samples of oats tested this summer received first prize at the Toronto Exhibition.

The past season has been an exceptionally hot and dry one over Ontario, and consequently, the yield of grain has been somewhat below what we would have expected had the weather been more favorable. The amount of rainfall during the summer, as measured in the large rain-gauge in the experimental field, was as follows :

During	May	1.58	inches.
"	June	2.36	"
"	July	.61	"
"	August	2.71	"
"	September	1.52	"

It would have added much to the value of the work had reports of rainfall been made from over the Province. In future we trust some plan may be adopted to accomplish this end.

There is much value and interest in the accompanying tables, and as they are condensed as much as possible, all that they contain cannot be seen at a glance. They should be carefully studied by all who are interested. While we present some notes with each table it is not intended as an elaboration, but merely to show what may be worked out of them. Conclusions must be carefully drawn, as there are many considerations which enter into any inference, which may seem to present itself. Soil, season, and previous cropping are all important factors in influencing results. Yet, viewing the work broadly, it will be safe to follow in the lines which they point out as giving the best results.

There is a broad field for experimental work among the grains. While we have not been lax in improvement by importation and careful breeding of our live stock, it cannot be said that we have done all that is possible in grain. Careful work by individual farmers and at this station would most assuredly be fraught with results of value to the agricultural community. While we regard with satisfaction the work of the past seasons, we realize the great necessity of its continuance in the future, there must be confirmatory, experiments, year by year, before definite information can be stated.

Experimental Grains for 1887.

Number.	Names of Varieties.	Grain.	Obtained in Spring, 1887, from
1	Squarehead	Wheat	Scotland.
2	Hallett's Hunter's White	"	"
3	Wooly-eared	"	"
4	Red Chaff White	"	"
5	Chevalier	Barley	"
6	Common	"	"
7	Sandy	Oats.	"
8	Tam. Findlay (grown on Nairn's farm)	"	"
9	" (grown on Cowan's farm)	"	"
10	Hopetown	"	"
11	Hamilton	"	"
12	Potato	"	"
13	Black	"	"
14	Blainslie	"	"
15	Tam. Findlay	"	"
16	Probsteier	Weizen (wheat)	Germany.
17	"	Hafer (oats)	"
18	"	Gerste (barley)	"
19	"	Roggen (rye)	"
20	Invincible	Wheat	Ontario.
21	Red Fife	"	"
22	Club	"	"
23	Rio Grande	"	"
24	White Fife	"	"
25	Red Fern	"	"
26	Lost Nation	"	"
27	Wild Goose	"	"
28	White Russian	"	"
29	Mars	"	"
30	Welcome	Oats	"
31	Black Tartarian	"	"
32	Canadian Triumph	"	"
33	Egyptian	"	"
34	White Australian	"	"
35	Six-rowed	Barley	"
36	Mensury	"	"
37	Two-rowed	"	"
38	Prussian Blue	Peas	"
39	Golden Vine	"	"
40	Prince Albert	"	"
41	White Marrowfat	"	"
42	Crown	"	"
43	Peerless White	Barley	England.
44	Empress	"	"
45	Golden Melon	"	"
46	Victoria Prize White	Oats	"
47	Red Nursery	Wheat	"
48	Early Racehorse White	Oats	"
49	Black Tartarian	"	"
50	Wooly-eared	Wheat	"
51	Potato	Oats	Scotland.
52	Blainslie	"	"
53	Chevalier	Barley	"
54	Squareheaded	Wheat	"
55	Stirlingshire	Barley	"
56	Sandy	Oats	"
57	Hunter's White	Wheat	"
58	Early Hamilton,	Oats	"
59	Probsteier	Hafer (oats)	Germany.
60	"	Gerate (barley)	"
61	Summer Zeelander	Roggen (rye)	"
62	Summer Sachsischer	" "	"
63	Winter Zeelander	" "	"
64	" "	Weizen (wheat)	"
65	" Sechszeilige	Gerste (barley)	"
66	Champion White	Wheat	England.
67	Improved Rough Chaff	"	"
68	Defiance Red	"	"
69	Selected Squareheaded	"	"

Barley tested on the Experimental Plots.

No. of Grain.	Variety.	Sown.	Brairded.	Headed out.	Matured and harvested.	General Appearance.		Size of Ground cropped.	Weight.	
						Straw.	Grain.		Straw.	Grain.
								Acre.	lbs.	lbs.
5	Chevalier	April 25	May 5	July 4	July 27	Bright and stiff	Plump and bright	1-10	340	158
6	Common	" 25	" "	June 30	" 25	"	"	1-10	259	137
18	Probsteier	" 25	" "	" "	" 25	Long, clean and stiff	"	1-10	312.5	203.5
35	Six-rowed	" 26	" "	" 26	" 16	Somewhat rusted	"	1-10	.....	152
36	Mensury	" 26	" "	" 30	" 25	Considerably rusted	Small and bright	1-10	214.5	155.5
37	Two-rowed	" 26	" "	July 6	" 27	A little rusted	Fair sample	1-10	219	119
43	Peerless White	May 7	" 13	" 14	Aug. 2	Small and shrunken	Small and shrunken	1-10	218.5	65.5
44	Empress	" "	" 12	" 14	" 3	Bright and stiff	Bright and shrunken	1-10	245	67
45	Golden Melon	" "	" 12	" 15	" 3	Bright and shrunken	"	1-10	228.5	83.5
53	Chevalier	" "	" 13	" 15	" 3	Bright and stiff	Small and shrunken	1-10	213	87
55	Stirlingshire	" "	" 15	" 4	July 26	A little rusted	Bright and shrunken	1-20	75	41.2
60	Probsteier	" "	" 12	" 9	Aug. 2	Bright and stiff	Small and shrunken	1-10	223	72

Remarks on the Barley Tests.

With the exception of one variety (No. 55), the barleys were all grown on range I. of the old experimental field. In 1882 this range was summer fallowed and supplied with a dressing of farmyard manure, and since that date it has been employed for testing cereals, with no additional fertilizing materials. The plots are somewhat lower than most of the surrounding land, and consist of a clay loam.

Ten varieties of barley have been tested this season; three obtained in Ontario, three from Scotland, three from England, and one from Germany. The quantity of seed sown on each plot was 9.5 pounds, except in the case of No 55, of which only one-half that quantity was used.

The varieties from the different countries gave the following produce of grain and straw per plots :—

Countries.	Grain, lbs.	Straw, lbs.
Scotland	121.	253.4
England	72.4	230.7
Germany	137.7	268.8
Ontario	142.2	216.8

We see from this that the Ontario varieties yield the greatest quantity of grain, and the least amount of straw. It could scarcely be expected that the foreign varieties would, during the first year, equal those obtained in Ontario, which have become adapted to the soil and climate.

It was unfortunate that a number of the imported grains were late in reaching us, in consequence of which the seeding took place at two different dates. Six varieties were sown on April 25th, and six varieties on May 7th. The table seems to show quite clearly that the different dates of sowing had a considerable influence upon the yield of grain, while the difference in the amount of straw was not so marked. A comparison between the average produce of grain and straw from the two dates of seeding is as follows :—

Date of Seeding.	Grain, lbs.	Straw, lbs.
April 25th	154.	269
May 7th	75.7	218.7

The yield of grain from the earlier seeding was more than double that from the latter. Variety of grain may have considerable to do in bringing about this difference, but when we refer back to the table and see the variation in the results of the same varieties, as in the case of Chevalier and Probsteier, we are forced to come to the conclusion that season was a very prominent factor in determining the yield. The date of seeding will have to be taken into consideration whenever conclusions from these tables are drawn.

Among the list of grains of the first sowing, the German variety stands pre-eminently above the rest in yield of grain. The barley was a good sample for the season, and the straw above the average in quality. The Ontario common six-rowed variety was nine days earlier than the rest in ripening. The grain was of good quality, although the straw was slightly affected with rust.

The samples of barley from the later seeding were somewhat inferior to the others. The straw was rather short, but clean and bright. In this case the Chevalier variety takes the lead in produce of grain, while the Peerless White occupies the lowest place giving 25% less than the Chevalier.

Oats Tested on the Experimental Plots.

No. of Grain.	Variety.	Sown.	Brairded.	Headed out.	Matured and Harvested	General Appearance.		Size of ground cropped.	Weight.	
						Straw.	Grain.		Straw.	Grain.
								Acres.	lbs.	lbs.
7	Sandy	April 27..	May 9..	July 15..	July 29..	Short, stiff, a little rusted..	Inferior quality, somewhat uneven.	1-20	187.5	29.5
8	Tam Findlay (Grown on Nairn's farm)	" 27..	" 8..	" 14..	" 29..	" " " ..	Grain small and light	"	179.	26.
9	Tam Findlay (Grown on Cowan's farm)	" 27..	" 8..	" 14..	" 29..	" " " ..	Grain small and light	"	169.2	28.8
10	Hopetown	" 27..	" 8..	" 11..	" 29..	" " " ..	Small but quite uniform	"	159.	35.
11	Hamilton	" 27..	" 8..	" 12..	" 29..	Short, stiff, and rusted some	Very poor quality, light and small.	"	149.5	27.5
12	Potato	" 27..	" 8..	" 11..	" 27..	" " " ..	Fair quality, quite plump..	"	142.	26.
13	Black	" 27..	" 8..	" 7..	" 26.	Badly rusted	Poor sample	"	.....	.....
14	Blainslie	" 27..	" 9..	" 15..	Aug. 3..	Short, stiff, a little rusted..	Very poor quality, light and small.	"	128.5	13.5
15	Tam Findlay	" 27..	" 9..	" 14..	July 29..	Short, stiff, very little rusted	Grain small and light	"	180.0	22.
17	Probsteier	" 27..	" 7..	" 6..	" 25..	Short but good	Medium in weight and color	"	.....	49.
30	Welcome	" 27..	" 8..	" 4..	" 19..	Badly rusted	Plump and very uniform	"	137.	47.
31	Black Tartarian	" 27..	" 9..	" 8..	" 26..	"	Poorly filled and somewhat faded.	"	207.	37.5
32	Canadian Triumph	" 27..	" 8..	" 2..	" 18..	Very badly rusted	Uniform sample, rather light	"	132.5	51.5
33	Egyptian	" 27..	" 9..	" 6..	" 26..	Tall, brittle, average rust ..	Small but well filled	"	189.8	75.2
34	White Australian	" 27..	" 8..	" 7..	" 29..	Long, stiff, and almost free from rust.	Fair sample, quite uniform.	"	139.	69.
46	Victoria White Prize ..	May 7..	" 14..	" 19..	Aug. 3..	Comparatively free from rust	Inferior quality, small and light.	"	164.	16.
48	Early Racehorse, white.	" 7..	" 15..	" 12..	July 26..	Badly rusted	Average sample in plumpness and weight.	"	154.5	18.5
69	Black Tartarian	" 7..	" 15..	" 15..	" 29..	Considerable rust.	Light in weight, badly faded	"	.....	17.8

Remarks on tests with Oats.

The new experimental plots, referred to in the introduction, were taken advantage of for the tests of the several varieties of oats. The soil is a clay loam, and much similar to that on which the barleys were tested. In 1885 a crop of spring wheat was taken off the land, and last year the field was summer fallowed, and fertilized with farmyard manure. Eighteen plots were occupied by oats this season, the greater number of which were in range No. II. the rest being in No. III. range. The quantity of seed used was $3\frac{3}{4}$ pounds of each variety. Nine plots were sown with oats received from Scotland, three from England, one from Germany, and five from Ontario. The seeding was all done on the same day, with the exception of the English varieties which were later reaching us in the spring. A comparison can be made of the varieties obtained through different sources, as was done in the case of the barleys. By looking at the table, we find the average yield of grain and straw per plot from the four sources to be as follows :—

Countries.	Grain, lbs.	Straw, lbs.
Scotland	26.0	161.8
England	17.4	159.2
Germany	49.0	....
Ontario	56.0	161.1

It must be remembered that the date of sowing the English varieties was later than that of the others, which fact may account for the small yield of grain in that case.

The best variety of each source appears to be as follows :—

Scotland ..... Hopetown.
England ..... Early Racehorse
Germany ..... Probsteier.
Ontario ..... Egyptian.

Among the other varieties, the Egyptian and the White Australian deserve considerable praise. The straw was almost free from rust, the grain of very good quality, and the yield about 25 per. cent above the average of the Canadian varieties. The Canadian Triumph was the earliest to mature, and had the rust not affected it so badly it would, probably, have taken a high stand.

The English oats became great victims to the rust, and the samples of grain were somewhat inferior to the average of the season, the Early Racehorse producing the best quality. An intermediate position was taken by the varieties from Scotland, while the one German sample made the best record of all the foreigners, the quality of both grain and straw being good, and the yield 40 per cent. above the next highest imported variety.

Wheats, Ryes and Peas tested on the Experimental Plots.

No. of Grain.	Variety.	Grain.	Sown.	Brairded.	Headed out.	Matured and Harvested.	General Appearance. Straw.	General Appearance. Grain.	Size of Ground cropped.	Weight. Straw	Weight. Grain.
									Acre.	lbs.	lbs.
20	Invincible	Spring Wheat.	April 22..	May 3..	July 6 .	July 29..	Dull from being badly mildewed	Badly [illegible]	1-20	90	16
21	Red Fife	"	" 22..	" 3..	" 6..	" 29.	Considerable rust	Somewhat shrunken	1-20	133.5	21.5
22	Club	"	" 22..	" 3..	" 4..	" 27..	Very badly rusted	Very poor quality	1-20	155.5	15.5
23	Rio Grande	"	" 22..	" 3..	" 2..	" 29..	Good quality	Large and plump	1-20	156.2	28.8
24	White Fife	"	" 27..	" 7..	" 6..	Aug. 3..	Very little rusted	Dark and shrunken	1-20	168	21
25	Red Fern	"	" 22..	" 3.	" 4..	July 29..	Good quality	Plump and large	1-20	155.5	44.5
26	Lost Nation	"	" 22..	" 3..	" 2..	" 27..	Rusted some	Medium plumpness	1-20	171.2	30.8
27	Wild Goose	"	" 22..	" 3..	" 4..	Aug. 3..	Long and clean	Plump and large	1-20	166.5	55.5
28	White Russian	"	" 22..	" 3..	" 2..	July 27..	Medium amount of rust.	Dark and shrunken	1-20	161.2	30.8
29	Mars	"	" 22..	" 3..	" 4..	" 26..	Very badly rusted	Small and shrunken	1-20	170.5	21.5
61	Summer (Zealander)	(Rye) Roggen	May 7..	" 12..	June 28..	Aug. 3..	Clean and short	Medium quality	1-10	133	45
62	Summer (Sachsischer)	"	" 7..	" 13..	" 28..	" 3 .	" "	" "	1-10	150.5	41.5
63	Summer Common	Rye	April 26..	" 5..	" 16..	July 26..	Long and wiry	Good quality	1-10	441	114
38	Prussian Blue	Peas	" 25..	" 6..	July 4..	Aug. 2..	Good	Good	1-10	298.5	161.5
39	Golden Vine	"	" 26..	" 6..	" 4..	July 27..	"	"	1-10	271.5	161.5
40	Prince Albert	"	" 26..	" 6..	" 2..	Aug. 2..	"	"	1-10	355.5	145.5
41	White Marrowfat	"	" 26..	" 6..	" 2..	" 2..	"	"	1-10	219	129
42	Crown	"	" 26..	" 6..	" 2..	July 27..	"	"	1-10	191.5	129.5

Remarks on tests of Spring Wheat, Ryes and Peas.

Spring Wheats.—Range No. 1, in the new experimental field, was the land used for the testing of spring wheats. The soil on this range is very similar to that on which the oats were grown, while the previous cropping was precisely the same. The plots were of equal size and shape (2x4 rods), each receiving exactly the same amount of seed. The work was confined to the testing of ten varieties, all of which were obtained in Ontario. Had there been also a number of foreign varieties experimented with, the results would no doubt have been looked upon with even more interest than these obtained. A few wheats were sent here as spring varieties, but either they were wrongly named, or else were unable to thrive through the change of climatic conditions. It will be seen by referring to the table that the wheats were all sown on the same date, and are in every respect under fairly uniform conditions. The plot containing the White Fife variety was, however, seeded five days later than the rest. The Mars was the earliest to mature, but the quality of the grain was below the average and the straw badly rusted. The Red Fern and Wild Goose wheats gave the largest yields, while the straw was bright and of good quality in each case. The Club, with the exception of the Mars, was affected with rust most of all the varieties, and the grain was of poor quality and light yield.

A number of imported grains were sent from here last spring to Prof. Saunders, of the Dominion Experimental Station, Ottawa. In return, eighteen varieties of spring wheats were forwarded to this station, but owing to the lateness of their arrival, along with the very dry season, we have at present to state that they were not a success.

Ryes.—Four samples of rye were sown in Range I. of the old experimental field at the rate of ten pounds to the plot. Full notes concerning this range are given under the barley tests. One variety (No. xx.), did not reach maturity, but the others did fairly well. The two German varieties gave almost equal yields of grain, and were very similar in every respect. The one from Ontario, sowed eleven days earlier, gave more than double the quantity of grain.

Peas.—The peas were sown in the same range as the barley and rye. Five varieties of Ontario peas were used in testing. The quantity of each sown to the plot was as follows: Prussian Blue, 12 lbs.; Golden Vine, 12 lbs.; Prince Albert, 12 lbs.; Crown, 18 lbs.; and White Marrowfat, 21 lbs. Although the season was so very hot and dry, still they did fairly well, and were free from the ravages of the pea weevil (*Bruchus pisi*). The Prince Albert variety takes an exactly intermediate position in point of yield of grain, the Prussian Blue and the Golden Vine being ahead, and the White Marrowfat and the Crown appearing at the end of the list.

NAMES AND ADDRESSES OF FARMERS TO WHOM EXPERIMENTAL GRAINS WERE SENT IN THE SPRING.

NAME.	ADDRESS.	COUNTY.
John Raymond	Moulinette	Stormont.
John Hall	Cornwall	"
Henry Mitchell	Pembroke	Renfrew.
Chas. Spooner	Glenburnie	Frontenac.
John A. Wilmot	Kingston	"
James Trace	Allenwood	Simcoe.
Richard Graham	Elmvale	"
John McIntosh	Springville	Peterborough.
Wm. Rutherford	South Monaghan	"
Hugh Davidson	Peterborough	"
John Campbell	Woodville	Victoria.
J. Lick	Oshawa	Ontario.
J. Holtby	Manchester	"
John Varcoe	Carlow	Huron.
Robert Auld	Warwick, West	Lambton.
Alex. M. Wigle	Ruthven	Essex.
Geo. A. Wintemute	Belle River	"
James Davidson	Union	Elgin.
John B. Carpenter	Simcoe	Norfolk.
Wm. Dawson	Vittoria	"
Hugh Rankan	Collins' Bay	Frontenac.
John McNealy	Sunbury	"
Donald McDonald	Sutton, West	York.
J. S. Smith	Ailsa Craig	Middlesex.
John S. Howes	Harriston	Wellington.
J. A. McCallum	Martintown	Glengarry.
John B. Stone	Norham	Northumberland.
Peter Christie	Meaford	Grey.
Wm. Budd	Delhi	Norfolk.
Thomas Abraham	Newark	Lincoln.
Geo. Hyde	Shakespeare	Perth.
Geo. Frame	Sebringville	"
Humphrey Snell	Clinton	Huron.
G. E. Cresswell	Egmondville	"
Edwin Gaunt	St. Helen's	"
J. I. Hobson	Mosboro'	Wellington.
John Rown	Pembroke	Renfrew.
Daniel Mick	Micksburg	"
John Sisson	Churchill	Simcoe.
Lewis T. Leavens	Bloomfield	Prince Edward.
John M. Sprague, M.P.P	Demorestville	"
Ralph Lett, Jr	Eganville	Renfrew.
R. J. Dunlop	Kingston	Frontenac.
John Dooner	Osceola	Renfrew.
J. M. Drummond	Keene	Peterborough.
H. M. Wilcox	Whitby	Ontario.
James R. Mathewson	Brooklyn	"
Prof. Wm. Saunders	Central Expt. Station	Carleton.
Peter Graham, M.P.P	Warwick, West	Lambton.
W. G. Baldwin	Colchester	Essex.
J. B. Couisineau	Windsor	"
Chas. E. Lundy	Newmarket	York.
Geo. Lobsinger	Deemerton	Bruce.
Kinsman Grey	Brampton	Peel.
A. H. Garbut	Brampton	"
Jonn McMillan	Newmarket	York.
Geo. Ambury	Lynch Lake	"
The Graham Bros	Dalrymple	Victoria.
D. H. McLean	Richmond	Elgin.
Robert Ballantyne (Langside)	Sebringville	Perth.
John Shehan	Newark	Lincoln.
Wm. Dunn, Sr	Ingersoll	Oxford.
Ed. Jeffs	Bond Head	Simcoe.
John McMillan	Constance	Huron.

NAMES AND ADDRESSES OF FARMERS, ETC.—*Continued.*

NAME.	ADDRESS.	COUNTY.
Alex. McLaren	Cromarty	Perth.
Thomas Ballantyne, M.P.P	Stratford	"
Wm. Collier	Ingersoll	Oxford.
James Begg	Moose Creek	Stormont.
Stephen Crandall	Cherry Valley	Prince Edward.
Thomas Wellbanks	Rednerville	"
James Hamblin	Woodbridge	York.
Geo. J. Morgan	Aultsville	Stormont.
Samuel Brown	Forest	Lambton.
James Begg	Tuam	Simcoe.
D. James	Thornhill	York.
D. A. Dowling	Appleton	Lanark.
Jabel Robinson	Middlemarch	Elgin.
Solomon Winters	Simcoe	Norfolk.
James Cohoe	Courtland	"
John Rymal	Hamilton	Wentworth.
Wm. Porter	Humber	York.
F. A. Nelles	York	"
Geo. Awrey	Binbrook	Wentworth.
Napoleon Rivard	Tecumseh	Essex.
Edward Trinder	Simcoe	Norfolk.
J. B. Boyce	Norham	Northumberland.
David Spencer	Rosehall	Prince Edward.
Thomas Walker	Ancaster	Wentworth.

Imported Cereals Tested by Farmers in Ontario During Summer 1887.

Number.	Name.	Grain.	Sown.	Brairded.	Headed.	Matured and Harvested.	General Appearance.	
							Straw.	Grain.
8	Tam Findlay	Oats	May 14..			Aug. 9..	Bright	Good, but not equal to seed.
"	" "	"	" 4..	May 16..	July 1..	" 6..	Fine, bright and stiff	Medium quality.
"	" "	"	" 2..	" 15..		" 1..	Stiff, and good length	Light.
"	" "	"	" 5..		June 23..	" 8..	Heavy	Very light.
"	" "	"	April 29..	May 7..	July 12..	" 15..	Strong, short and stiff	Light.
9	" "	"	" 28..		" 5	July 26..	Fine and soft	"
"	" "	"	May 14..	May 21..	" 29	Aug. 17..	Good	Plump and good.
15	" "	"	" 6..	" 13..	" 12	" 11..	Coarse and clean	Medium.
10	Hopetown	"	" 14..			" 15..		Good.
"	"	"	" 3..		July 5..	" 16..	Bright and short	Small, but plump.
"	"	"	" 14..	May 22..		" 13..	Rusty	Light.
"	"	"	" 5..		June 26..	" 8..	Heavy	"
"	"	"	April 28..		July 3..	July 26..	Stiff and strong	"
"	"	"	May 14..	May 21..	" 29	Aug. 17..	Good	Plump and good.
7	Sandy	"	" 14..	April 29..	May 7..	" 15..	Strong, short and slight	Light.
"	"	"	" 14.	May 21..	July 29..	" 17..	Good	Plump and good.
"	"	"	" 6..	" 14..	" 14..	" 12..	Very rusty	Small.
"	"	"	" 14..	" 6..	" 12..	" 9	Fine, bright and stiff	Medium quality.
"	"	"	" 3		" 5..	" 16..	Bright and short	Small, but plump.

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	Size of ground cropped.	Weight of		Nature of Soil.	Previous Cropping.	County in which Tested.	Remarks.
		Straw.	Grain.				
	sq. feet.	lbs.	lbs.				
8	672	.....	24	Gravelly loam	Oats, 1886	Stormont	Barn yard manure in fall of 1885, and plowed under.
"	1170	122	42	Heavy clay soil.....	Hungarian grass, 1886	Huron	Well manured in 1886.
"	1452	98	12	Sandy loam	Corn crop, 1886.....	Simcoe	Well manured in fall of 1886.
"	.....	101	18	.....	Oats, 1886.....	Perth	Manured in spring of 1887.
"	1815	114	32	Clay, with stones.....	Fall wheat, 1886.....	York	Well manured in 1885.
9	1089	74	32	Rich sandy loam	Wheat, 1885; Mangels, 1886.	Norfolk	Manured for the mangels.
"	450	.....	35	Clay loam...	General rotation.....	Stormont	
15	448	21½	8½	Sandy loam	Potatoes, 1886.....	Wellington	Well manured.
10	924	.....	22¾	Gravelly loam	Oats, 1886.....	Stormont	Manured in fall of 1886, at rate of 25 loads per acre.
"	1200	68	30	Sandy loam	Fall wheat, 1886.....	Essex	
"	1452	90	11	" "	Corn crop, 1886.....	Simcoe	Well manured in fall of 1886.
"	....	114	32	....	Oats, 1886.....	Perth	Manured in spring of 1887.
"	1089	92	38½	Rich sandy loam.....	Wheat, 1885; Mangels, 1886...	Norfolk	Manured for mangels.
"	450	.....	37	Clay loam.....	General rotation.....	Stormont.....	
7	1815	100	29	Clay, with stone...	Fall wheat, 1886.....	York	Well manured in 1885.
"	450	.....	27	Clay loam.....	General rotation.....	Stormont	
"	448	24	7	Sandy loam	Potatoes, 1886.....	Wellington	Well manured.
"	1170	135	30	Heavy clay loam.....	Hungarian grass, 1886	Huron	Well manured in 1886.
"	1200	60	15	Sandy loam	Fall wheat, 1886.....	Essex	

NOTE.—This table is a continuation of that on previous page.

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	NAME.	Grain.	When Sown.	Brairded.	Headed.	Matured and Harvested.	GENERAL APPEARANCE.	
							Straw.	Grain.
12	Potato	Oats	May 14			Aug. 27	Rusted	
51	"	"	" 18	May 26	July 24	Sept. 15	Good	Good.
"	"	"	" 12	" 19	" 13	Aug. 8	Short	Light.
"	"	"	" 12	" 19		" 6		
17	Probsteier	Hafer (Oats)	" 16	" 23	July 10	" 2	Strong and heavy	Inferior to seed.
"	"	Hafer (Oats)	" 12		" 6	" 17	A little rusty	Good.
11	Hamilton	Oats	" 14			" 15	Bright	"
"	"	"	" 3		July 5	" 16	Bright and short	Small but plump.
"	"	"	" 5		June 26	" 8	Heavy	Light.
"	"	"	April 28		July 8	July 26	Strong and stiff	Plump.
58	"	"	May 14		" 10	Aug. 8	Bright	Very bright.
13	Black	"	" 12		" 4	" 17	Good	Good.
"	"	"	" 6	May 14	" 9	" 4	Coarse and clean	Large and well filled.
48	Early Racehorse	"	" 14			" 16	Rusted	
"	"	"	" 17	May 21		" 3	Bright and long, a little coarse	
"	"	"	" 17	June 4	July 11	" 8	Rusty	
"	"	"	" 12	May 16	" 5	" 4	Rusted badly	Very good.
"	"	"	" 20	June 12	" 20	" 8	Rusted, did not stand well	Light.
"	"	"	" 14	" 1	" 13	" 14	Heavy and badly rusted	"

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	Size of Ground Cropped.	Weight of		Nature of Soil.	Previous Cropping.	County in which Tested.	Remarks.
		Straw.	Grain.				
	Sq. feet.	lbs.	lbs.				
12	.....	.....	4	Sandy loam	Fall wheat and rape, 1886	Norfolk	Manured in fall of 1885; 20 loads per acre.
51	1089	108	50	Loam	Natural sod	Parry Sound	New land, broken up last spring.
"	1089	56	14¾	Clay loam	Hay, 1885; peas 1886	Glengarry	Land friable and naturally dry.
"	.....	150	65	.....	.....	Simcoe	
17	1098	.....	16	Rich loam	Roots, 1886	York	
"	1350	43	14	Clay and black sand	Potatoes, 1886	Bruce	
11	672	.....	22¾	Gravelly loam	Oats, 1886	Stormont	Barnyard manure in fall of 1885, plowed under.
"	1200	64	27	Sandy loam	Fall wheat, 1886	Essex	
"	.....	92	24	.....	Oats, 1886	Perth	Manured in spring of 1887.
"	1089	56	25	Rich sandy loam	Wheat, 1885; Mangels, 1886 ..	Norfolk	Manured for mangels.
58	1080	40	8	Sandy loam	Sod, 1886	Wentworth	
13	1350	72	18	Clay and black sand	Potatoes, 1886	Bruce	
"	1448	20½	14½	Sandy loam	"	Wellington	Well manured.
48	.....	.....	4	"	Fall wheat and rape, 1886	Norfolk	Manured in fall of 1885; 20 loads per acre.
"	1170	40	30	Clay loam	Peas, 1885; Oats, 1886	Frontenac	Manured for potatoes this spring.
"	.....	.....	13	"	.....	Elgin	Manured October 1886.
"	990	95	25	"	Sod, 1885; Oats, 1886	Huron	Well manured with horse dung.
"	675	.....	30	"	Oats, 1885; Oats, 1886	Stormont	New land, manured well in spring of 1887.
"	612	48	16½	"	Summer fallow, 1886	Huron	Sown where fall wheat killed out.

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	NAME.	Grain.	When Sown.	Brairded.	Headed.	Matured and Harvested.	GENERAL APPEARANCE.	
							Straw.	Grain.
48	Early Racehorse.....	Oats	May 23..	June 1..	July 17..	Aug. 24..	Medium length and bright	Bright, but light.
"	"	"	" 13..	May 22..	" 13..	" 9..	Short, stiff and very bright.	Plump.
"	"	"	" 14..	.....	" 5..	" 1..	Very bright	Bright and pretty plump.
"	"	"	" 12..	May 18..	" 10..	" 8..	Long and fine, not very bright....	Bright and fairly well filled.
"	"	"	" 12..	" 16..	.....	" 20..	Bright and medium length	Large and good.
"	"	"	" 16..	" 20..	July 10..	" 4..	Fair length, fine and bright	Plump and good.
"	"	"	" 14..	June 15..	" 25..	" 10..	Very strong and bright but coarse.	Plump and nice.
"	"	"	" 12..	.....	June 29..	" 17..	Good	Good.
"	"	"	" 12.	May 19..	.....	July 26..	....	
"	"	"	" 14..	.....	July 6..	" 30..	Medium.....	Fair.
"	"	"	" 16..	May 18..	June 28..	Aug. 4..	Heavy, but soft.....	Rather coarse.
"	"	"	" 14..	" 20..	July 10..	July 28..	Strong and heavy.....	Not equal to sample.
49	Black Tartarian	"	" 14..	.....	.....	Aug. 16..	Rusted.....	
"	"	"	" 17..	May 22	.....	" 3..	Rusted and very coarse	
"	"	"	" 17..	" 27..	July 16..	" 15..	Rusty	
"	"	"	" 12..	" 16..	" 13..	" 12..	Rusted, but strong and heavy	Good.
"	"	"	" 18..	" 25..	" 29..	Sept. 10.	Good.....	Good.
"	"	"	" 14 .	June 1..	" 20..	Aug. 15..	Medium, slightly rusted.....	Not equal to sample sown.
"	"	"	" 23..	" 1..	" 20..	" 24..	Medium length and bright	Very good.

Number.	Size of ground Cropped.	Weight of		Nature of Soil.	Previous Cropping.	County in which Tested.	Remarks.
		Straw.	Grain.				
	Sq. feet.	lbs.	lbs.				
48	432	.....	51	Clay loam.....	Summer fallow, 1886.....	Stormont.....	Manured, 1886.
"	1360	80	52	Heavy clay.....	Sod, 1885; oats, 1886	Perth	
"	990	45	25	Sandy loam	Barley, 1886.....	Wentworth	
"	1089	59	27½	Clay loam.....	Hay, 1885; peas, 1886...	Glengarry	Land friable and naturally dry.
"	2562	.....	42	Heavy clay.....	Roots, 1886.....	Peterborough.....	Well manured, a good piece of land.
"	....	.....	18	Clay loam.....	Mangels, 1886	Peterborough.....	Manured in fall of 1885.
"	720	.....	18	Black loam and clay sub-soil	A rotation of hay, cereal and root crops for 60 years	Prince Edward	
"	1350	40	7	Clay and black sand	Potatoes, 1886	Bruce	
	.....	190	74	.....	....	Simcoe	
"	1089	41¼	11	Poor clay loam	Barley, 1884; oats, 1885; Alsike clover, 1886	Ontario.....	
"	1088	.....	23	Clay loam	Peas, 1885; oats, 1886.....	Simcoe	
"	1098	.....	17	Rich loam.....	Roots, 1886.....	York	
49	.....	.....	7	Sandy loam.....	Fall wheat and rape, 1886	Norfolk	Manured in fall of 1885, 20 loads per acre.
"	1170	55	25	Clay loam	Peas, 1885; oats, 1886.....	Frontenac	Manured for potatoes this spring.
"	.....	.....	24	Clay loam	.....	Elgin	Manured, October, 1886.
"	990	125	36	Clay loam	Sod, 1885; oats, 1886.....	Huron	Well manured with horse dung.
"	1089	148	53	Loam	Natural sod	Parry Sound	New land broken up last spring.
"	675	55	24½	Clay loam	Summer fallow, 1886	Huron	Sown where fall wheat killed out.
"	432	.....	50	Clay loam...	Summer fallow, 1886	Stormont.....	Manured, 1886.

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	NAME.	Grain.	When Sown.	Brairded.	Headed.	Matured and Harvested.	GENERAL APPEARANCE.	
							Straw.	Grain.
49	Black Tartarian	Oats	May 13..	May 22..	July 17..	Aug. 16..	Soft and rusted some	Light, not ripened well.
"	"	"	" 14..	.....	" 10..	" 12..	Bright	Very bright.
"	"	"	" 12..	May 18..	" 20..	" 12..	Short, coarse and some rusted	Uneven and poorly filled.
"	"	"	" 12..	" 16..	.....	" 20..	Bright, medium length	Large and good.
"	"	"	" 16..	" 20..	July 11..	" 8..	Good length, coarse and rusted	Plump and good.
"	"	"	" 14..	June 20..	" 29..	" 16..	Coarse, heavy straw	Plump and good.
"	"	"	" 12..	May 18..	.....	" 10..	.....	
"	"	"	" 14..	.....	" 9..	July 30..	Rusted badly	Poor.
"	"	"	" 16..	May 19..	" 1..	Aug. 13..	Heavy but soft	Rather coarse.
"	"	"	" 14..	" 20..	" 10..	July 28..	Strong and heavy	Inferior to seed.
5	Chevalier	Barley	" 4..	" 11..	June 20..	Aug. 1..	Clear and bright	Very poor sample.
"	"	"	" 3..	.....	July 1..	" 10..	Bright and short	Shrunken.
"	"	"	" 2..	May 15..	.....	July 28..	Stiff and bright	Plump.
"	"	"	Apr. 28..	" 6..	July 8..	Aug. 6..	Fair length	Fairly good.
"	"	"	May 14..	" 21..	" 17..	" 7..	Good	Plump and good.
53	"	"	" 14..	.....	.....	" 16..	Bright	
"	"	"	June 1..	June 5..	Aug. 5..	Sept. 7..	Good	Good.
"	"	"	May 12..	May 16..	July 8..	Aug. 5..	Large, colored some	Plump, colored some.
"	"	"	" 12..	" 17..	.....	" 3..	.....	

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	Size of ground Cropped.	Weight of		Nature of Soil.	Previous Cropping.	County in which Tested.	Remarks.
		Straw.	Grain.				
	Sq. feet.	lbs.	lbs.				
49	1632	167	49	Heavy clay	Sod, 1885 ; oats, 1886	Perth	
"	1080	50	8	Sandy loam	Sod, 1886	Wentworth	
"	1089	71½	23¼	Clay loam	Hay, 1885 ; peas, 1886	Glengarry	Land friable and naturally dry.
"	2562	.....	42	Heavy clay	Roots, 1886	Peterborough	Well manured ; a good piece of land.
"	.....	.....	14	Clay loam	Mangels, 1886	Peterborough	Manured in fall of 1885.
"	720	.....	20	Black loam, clay subsoil	A rotation of hay, cereal and root crops for 60 years	Prince Edward	
"	.....	200	70	.....	.....	Simcoe	
"	1089	34	11	Poor clay loam	Barley, 1884; oats, 1885; Alsike clover, 1886	Ontario	
"	1088	.....	42	Clay loam	Peas, 1885 ; oats, 1886	Simcoe	
"	1098	.....	17	Rich loam	Roots, 1886	York	
5	660	52	28	Rich, heavy clay	Hungarian grass, 1886	Huron	Well manured in 1886.
"	1200	86	24	Sandy loam	Fall wheat, 1886	Essex	
"	1452	86	40	Clay loam	Potatoes, 1886	Simcoe	Manured and plowed in fall.
"	1815	90	40	Clay with stones	Fall wheat, 1886	York	Well manured in 1885.
"	750	.....	40	Clay loam	General rotation	Stormont	
53	.....	.....	3	Sandy loam	Fall wheat and rape, 1886	Norfolk	Manured in fall of 1885—20 loads per acre.
"	1089	112	65	Loam	Natural sod	Parry Sound	New land ; booken up last spring.
"	1089	37½	28½	Clay loam	Hay, 1885 ; peas, 1886	Glengarry	Land friable and naturally dry.
"	.....	220	95	.....	.....	Simcoe	

IMPORTED CEREALS TESTED, ETC.—*Continued.*

Number.	NAME.	Grain.	When Sown.	Brairded.	Headed.	Matured and Harvested.	GENERAL APPEARANCE.	
							Straw.	Grain.
6	Common	Barley	May 14			July 28	Bright straw	Good but inferior seed.
"	"	"	" 3		June 20	Aug. 10	Bright and short	Shrunken.
"	"	"	" 2	May 15		July 28	Weak	Fair.
"	"	"	" 5		June 18	" 25	Medium	Good.
"	"	"	Apl. 29	May 6	July 8	Aug. 6	Fair length	Fairly good.
18	Probsteier	Gerste (Barley)	May 16	" 20	" 26	July 30	Light, but bright	Not well filled.
60	"	"	" 17	" 23	" 4	" 28	Strong and heavy	Not good as seed.
43	Peerless White	Barley	" 12	" 17		Aug. 9	Light and short	Bright, but shrunken.
"	"	"	" 16	" 19	July 8	" 4	Very short and rusted	Long and fair.
45	Golden Melon	"	" 20	" 25	" 21	" 8	Not properly matured	Rusted.
"	"	"	" 23	June 1	" 15	" 21	Bright, but short	Bright, shrunken.
"	"	"	" 14	" 28	" 3	July 19	Very small	Very small.
55	Stirlingshire	"	" 12	May 14	" 4	Aug. 3	Short	Shrunken.
"	"	"	" 14	June 1	" 10	" 8	Heavy	Large and plump.
"	"	"	" 13	May 19	" 2	" 2	Short, stood up well	Very good, plump and large.
"	"	"	" 14		" 4	July 26	Bright	Bright, but light.

IMPORTED CEREALS TESTED, ETC.—*Concluded.*

Number.	Size of ground Cropped.	Weight of		Nature of Soil.	Previous Cropping.	County in which Tested.	Remarks.
		Straw.	Grain.				
	Sqr. feet.	lbs.	lbs.				
6	512	.....	29½	Gravelly loam	Oats, 1886	Stormont.....	Barnyard manure in fall of 1885, and ploughed under.
"	1200	51	30	Sandy loam.....	Fall wheat, 1886	Essex	
"	1452	52	27	"	Corn crop, 1886	Simcoe	Well manured in fall of 1886.
"	.....	53	29	....	Oats, 1886.....	Perth	Manured in Spring of 1887.
"	1815	89	38	Clay, with stones....	Fall wheat, 1886..... .	York.....	Well manured in 1885.
18	1360	....	24	Clay loam.	Peas, 1885 ; Oats, 1886.....	Simcoe.....	
60	891	.....	18	Rich loam.....	Roots, 1886.....	York	
43	1452	.....	17	Heavy clay	"	Peterborough...	Well manured, a good piece of land.
"	.....	.....	7	Clay loam	Mangels, 1886	"	Manured in fall of 1885.
45	675	....	38	"	Oats, 1885 and 1886	Stormont.....	New land, manured well in spring of 1887.
"	432	.....	58	"	Summer fallow, 1886.....	"	Manured, 1886.
"	720	.....	21	Black loam, clay subsoil.	A rotation of hay, cereal and root crops for 60 years.	Prince Edward	
55	990	75	15	Clay loam.....	Sod, 1885; oats, 1886	Huron	Well manured with horse dung.
"	632	34	17	"	Summer, fallow, 1886	"	Sown where fall wheat killed out.
"	1360	44	39	Heavy clay....	Sod, 1885; oats, 1886	Perth	
"	880	40	10	Sandy loam.....	Barley, 1886.....	Wentworth.....	

Remarks on Imported Cereals Tested by Farmers.

It will be seen from the foregoing list that grains were sent last spring to no less than eighty-eight farmers over the Province of Ontario. The weight of each sample sent was exactly two pounds in every instance, and from four to seven samples were forwarded to each individual. Owing to the very severe season the lateness in which some of the grains were sown, as well as for various other reasons, a few of the counties to which grain were sent are unrepresented in the returns. Results of tests have been received from seventeen counties of Ontario.

The grains sent out from this station were all imported last spring from Germany, England and Scotland, and the last which arrived were back to the express office for distribution within twenty-four hours after reaching us.

In working up the returns of the grain experiments, as sent in from the Provincial Experimenters, I have endeavoured to present the results in as clear and as concise a form as possible, while, at the same time, I have been very careful to omit nothing which would at all affect the value of the experiment, or which would be of general interest to the public.

A table has been made, in which each horizontal line contains the principal details of the test of one variety. The various experiments on each grain have been placed side by side, so that the results may be more easily compared and studied.

The different varieties of imported grains are now given with their average results from the accumulated tests of each. They are arranged in order of their yield of grain during the last season :

Oats.

Variety.	Weight of Straw.	Weight of Grain.	Total Weight.
	lbs.	lbs.	lbs.
Potato	104.7	33.4	138.1
Black Tartarian	100.7	30.3	131.0
Hopetown	91.0	28.5	119.5
Racehorse	70.9	26.9	94.8
Tam Findlay	88.4	25.4	113.8
Sandy	79.7	21.6	101.3
Early Hamilton	63.0	21.4	84 4
Black	46.3	16.3	62.6
Probsteier	43.0	15.0	58.0
Total Average	76.4	24.3	100.4

BARLEY.

VARIETY.	Weight of Straw.	Weight of Grain.	Total Weight.
	lbs.	lbs.	lbs.
Chevalier	94.6	40.4	138.0
Golden Melon	.....	39.0	.....
Common 2-rowed of Scotland	61.3	30.7	92.
Probsteier	.....	21.0	.....
Stirlingshire	48.2	20.2	68.4
Peerless White	.....	12.0	.....
Total Average	68.0	27.2	99.3

NAMES AND ADDRESSES OF FARMERS TO WHOM IMPORTED WHEATS WERE SENT THIS FALL.

NAMES.	Post Office.	County.	Number of the Variety sent.
Thomas Inglis	Belmore	Huron	54, 69, 67
A. R. Kidd	Warsaw	Peterborough	54, 50, 64
Wm. Nancekville	Ingersoll	Oxford	54, 50, 64
E. M. Zavitz	Coldstream	Middlesex	65, 64, 66
H. A. Morgan	Kerwood	Middlesex	66, 50, 65
A. E. Wark	Wanstead	Lambton	68, 57, 64
J. B. Muir	North Bruce	Grey	54, 69, 67
Robert Story	Pakenham	Lanark	64, 65, 66
Thomas Graham	Bell's Corners	Lanark	54, 69, 67
F. J. Sleightholm	Humber	Peel	66, 50, 65
R. M. Holtby	Manchester	Ontario	66, 50, 65
D. A. Dowling	Appleton	Lanark	68, 69, 65
Donald McDonald	Stutton, West	York	54, 50, 64
W. J. Stover	Norwich	Oxford	68, 67, 65
T. Raynor	Rosehall	Prince Edward	68, 69, 65
Elmer Lick	Oshawa	Ontario	66, 57, 67
S. P. Zavitz	Coldstream	Middlesex	66, 69, 64
Kinsman Grey	Brampton	Peel	68, 69, 65
John Rymal	Hamilton	Wentworth	68, 50, 67
R. E. King	De Cewsville	Haldimand	68, 50, 67
John B. Carpenter	Simcoe	Norfolk	54, 57, 65
Wm. Budd	Delhi	Norfolk	64, 65, 66
Geo. Hyde	Sebringville	Perth	64, 65, 66
Samuel Brown	Forest	Lambton	64, 66, 69
J. I. Hobson	Mosboro'	Wellington	66, 50, 65
John McMillan	Constance	Huron	68, 57, 64
E. Denton	London	Middlesex	68, 57, 64
David Spencer	Rosehall	Prince Edward	66, 57, 67
Wm. Dawson	Vittoria	Norfolk	68, 50, 67
Jabel Robinson	Middlemarch	Elgin	68, 50, 67
J. B. Boyce	Norham	Northumberland	66, 57, 67
Robert Ballantyne (Langside)	Sebringville	Perth	54, 57, 65
Oscar Chase	Sparta	Elgin	66, 69, 64
Edgar Haight	Sparta	Elgin	54, 57, 65
Napoleon Rivard	Tecumseh	Essex	54, 57, 65
Ed. Jeffs	Bond Head	Simcoe	54, 69, 67
J. S. Smith	Ailsa Craig	Middlesex	54, 50, 64
J. D. Zavitz	Coldstream	Middlesex	68, 57, 64
James Hamblin	Berwick	York	66, 57, 67
J. B. Couisineau	Windsor	Essex	66, 69, 64
Prof. Wm. Saunders	Experimental Station	Carleton	65, 67, 63, 66, 68, 64, 54, 50, 57, 69.

In conclusion, I wish to say that it is earnestly hoped that the work of cereal testing, as carried on during the last season, may be continued and steadily increased. It is through co-operative work of interested and energetic farmers, along with the assistance from this institution, that valuable results may be expected.

We have received from Australia eighteen varieties of spring grain, which we intend testing another season. No Russian grains have, as yet, been imported; but considering the success of testing during the past year, it seems very proper that steps be taken to secure some of the best Russian varieties for the coming season. At present we have on hand small quantities of Australian cereals, as well as a number of those named in the first part of this report, of which a distribution over the Province would be advisable. It is important that the experimenters of last year sow, during the coming spring, the produce which they received from their plots. From many letters received from farmers expressing the interest they have felt and value they have received from carrying on the tests, we are led to believe that they feel well repaid for time and labour expended.

Respectfully submitted,

C. A. Zavitz.

Effects of Special Fertilizers over a Four Year Rotation.

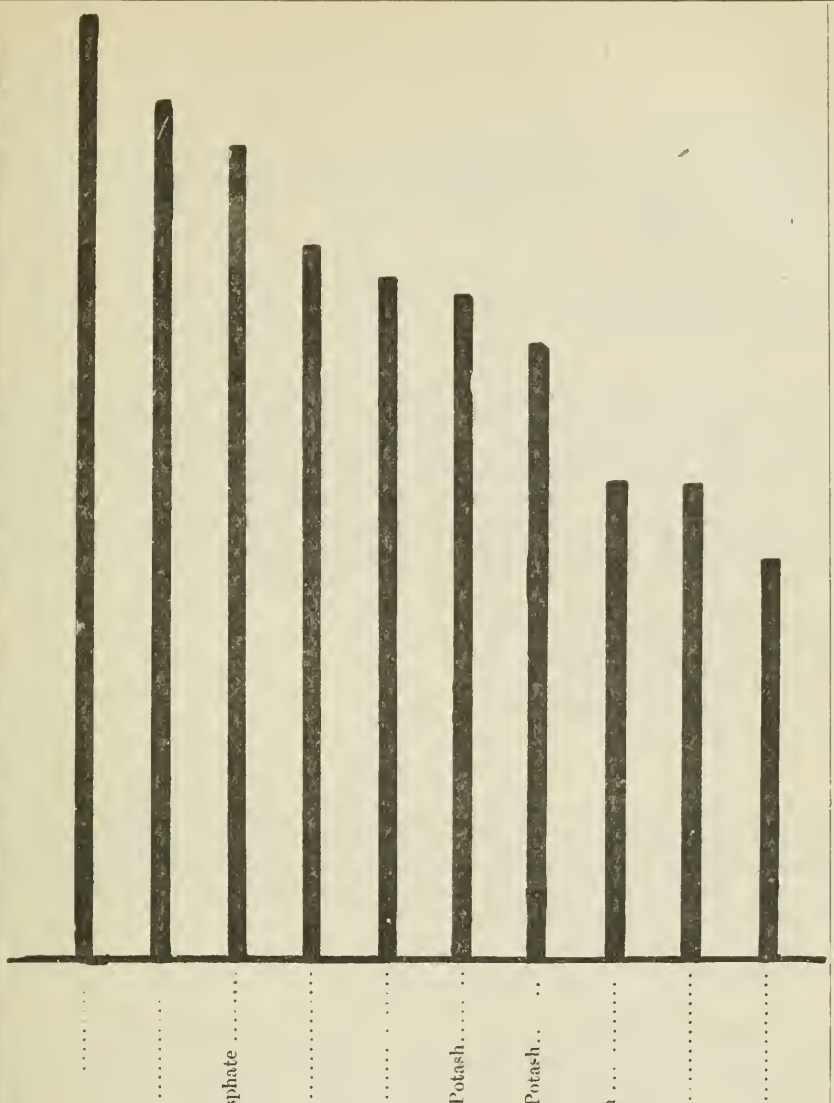
No fertilizers	100 (Reference.)
Lime	84
Nitrogen mixture and muriate of potash	101
Nitrogen mixture, mineral superphosphate and muriate of potash	132
Mineral superphospate and muriate of potash	140
Muriate of potash	143
Nitrogen mixture	150
Nitrogen mixture and mineral superphosphate	171
Mineral superphosphate	182
Farm yard manure	198

N.B.—Nitrogen mixture: equal parts of nitrate of soda, sulphate of ammonia and dried blood.

Analysis of Soil of Experimental Plots.

Moisture	2·941
Organic and volatile matter	10 494
Sand, silica and insoluble silica	78·590
Phosphoric acid	0·039
Sulphuric acid	0·150
Oxide of iron and alumina	0·297
Zinc	0·925
Magnesia	0·420
Potash	0·086
Soda	0·056
	100·000

RESULT OF FERTILIZERS OVER A FOUR COURSE ROTATION.


1—Farmyard Manure.....
2—Mineral Superphosphate .....
3—Nitrogen Mixture and Mineral Superphosphate .....
4—Nitrogen Mixture.....
5—Muriate of Potash... .....
6—Mineral Superphosphate and Muriate of Potash.....
7—Nitrogen Mixture, Min. Sup., and M. of Potash..
8—Nitrogen Mixture, and Muriate of Potash ... .
9—No Fertilizers ....
10—Lime.....

Per Acre per Annum Value.

Lime	$27
No fertilizers	31
Nitrogen mixture and muriate of potash	32
Nitrogen mixture, mineral superphosphate and muriate of potash	42
Mineral superphosphate and muriate of potash	44
Muriate of potash	46
Nitrogen mixture	48
Nitrogen mixture and mineral superphosphate	53
Mineral superphosphate	56
Farmyard manure	60

Note the low effects of lime, the apparently stationary result of nitrogen mixture with muriate of potash,—that from land having no fertilizer being taken as a standard of 100. Note also the comparatively low position taken by a mixture of the three (132), and the much higher when nitrogen mixture alone is applied. There is evidently an agreement for good in the association of the nitrogen mixture with mineral superphosphate (171), which comes between the results of each when applied separately. Mineral superphosphate has certainly made an important mark in the testing, but yet not equal to the sheet-anchor of all solid farming—farmyard manure.

Crops were: 1st year—Roots.
" 2nd " —Barley, seeded.
" 3rd " —Hay.
" 4th " —Oats.

Ensilage again.

It will be remembered how much we attempted in this direction previous to our large fire, and how little we developed satisfactorily. On the completion of the new farm buildings part of the root cellar, brick walls and cement floor, was set aside for a fifteen ton silo, and having studied all available experiences on the subject, made the following notes as a guide for ourselves and others.

Silo and Silage.

How to preserve fodder of any kind in a healthy, green condition all winter for the use of live stock, is yet, to some extent, a problem. Beginning in France, the silo or pitting system came to the States some six years ago, thence to England, where it has taken deeper hold than anywhere else. The States of New York and Wisconsin are probably now the most prominent practical believers in it, and Canada reflects but a mere shadow.

Any crop will make silage if taken in proper condition and at the proper time, but the most common are clover, meadow grasses and corn. In either there must be a maturity without decay, so that the most feeding value be secured along with the best condition for preservation.

Corn should be planted in the usual manner, in hill, three and one-half feet apart each way, but with three times more seed, thoroughly cultivated, and cut when in tassel and in glaze, or immediately after blooming. This very concise recommendation is not in exact agreement necessarily with the science, without which we could not proceed in this harvesting. It has been ascertained that no green fodder should be placed in a silo if it has more than *75 per cent of water* in its composition, because this proportion indicates the best stage of maturing and the best for the different processes in the silo; hence, before cutting the corn, and as a better guide than glaze or tassel, it is well to make a rough physical analysis of it, which any handy well-read man can do.

Cut with a strong mower so as to get everything neat "heads and tails;" avoid wet weather, and allow the corn to lie one day before hauling.

There are several forms of the silo—the stack, the portable form, the hole in the ground, and the expensively built one of brick and cement. Part of an ordinary root cellar answers if it is dry and walls plumb. Any ordinary mechanical hand will contrive the most efficient and cheapest according to special conditions when once the wants are understood. The size will depend upon number of cattle kept, allowing two tons for each during the winter; but the smallest will not be economical under ten tons, and because of unnecessary exposure when opening and using, the largest should not exceed fifty tons; consequently, if one hundred tons are required, it is advisable to have two separate silos of fifty tons each. As finally compressed silage weighs about 40 lbs per cubic foot, and as a height of fifteen feet is better than a width of fifteen, and as also the fodder will *sink one-third*, a ten ton silo will require to be fifteen feet deep, seven feet wide and seven feet long. "A perfect silo should be air-tight, water-tight, and as nearly as possibly heat tight;" no drain is necessary, and it is better to have no door in the side. Cement the floor and walls, and have the roof so that rain and snow are kept out. If a wooden partition is necessary—or, in the case of cutting off a part of a cellar, use 4x4 studs, with double-inch boards and tar paper between—the side next the fodder, of course.

Pass the corn fodder through a straw cutter in as short pieces as possible, and throw immediately into the silo; tramp carefully round the walls as filling proceeds, and stop when four feet in depth is obtained.

Now comes the most important point in all the "making": the temperature of the first, and of all subsequent batches, *must* reach 122° Farh., and until it is this no more can be added; if the heat exceeds 122°, do not be afraid as it can never rise so high as to produce spontaneous combustion. The time required for the proper temperature will be, depending upon condition of fodder, weather, condition of silo, and special management—from two to three days; ascertain temperature by burying thermometer in middle of material for ten minutes, proceed with the filling in two other batches, and allow proper temperature of last one before beginning to close up.

The covering may be of tarred paper, overlaid with inch boards, and weighted with stones up to 100 lbs. per square foot. The subsidence will be rapid, and everything having been properly attended to, the closing of the silo will be an almost complete air-tight case that two months afterwards should give corn fodder about as green and fresh as the day it was cut, and at the same time nearly free of acidity.

In opening the silo remove stones, boards, and paper from one end, broad enough to permit a man to use a long knife; cut clean down as the fodder is required, throwing it over the partition or by any mechanical contrivance found most suitable for the particular situation. Proceed with sections of the "pudding" as required for consumption.

Experiments to test the effect of extra Summer Fodder on the Quantity and Quality of Milk.

(Review from 1886 Report.)

1. Twelve common Ontario grade cows, averaging six years, 1,100 lbs. in weight, and two months after calving, were used in these experiments. None of the cows were in calf previous to 5th July, and five were considered to be so at the close of the work. The cows were divided into three lots of four each, and milked at 6 a.m. and 5.30 p.m. The milk record of the whole herd for the summer was an average of 27.9 lbs. per head daily.

2. The weather of the three periods that were selected as most severe on pasture and cattle, will be gathered from the following:—

——	July 21 to 31.	August 2 to 7.	August 9 to 14.
Highest temperature	89°.8	87°	92°.3
Lowest temperature	41°.5	41°.5	46°.
Mean temperature	66°	58°.7	69°.7
Rainfall	1.4 inch.		.78

3. The grazing consisted of part natural grasses on unreclaimed land, part bush, part fallow land, and part hay aftermath. The green fodders were supplied twice in the house when milking, at a rate of 20 lbs. per head daily.

4. Milk was set for 24 hours in the ordinary shot-gun cans, 20x8 inches, two inches of cream in which are taken as the standard of one pound of butter, in connection with patrons for our creamery. The average temperature of the milk at setting was 85°—extremes 82° and 91°—and gradually lowered by water and ice to a mean of 41°—extremes 40° and 43°.

5. An analysis of the accompanying table of results indicated the following facts, which, of course, must be supplemented with more tests in after years:—

Lot.	Periods.	Milk per cow daily.	Total milk used.	Inches of cream removed.	Butter obtained.	Butter per 100 lbs. milk.	Chemical Analysis.			Feed.
							Per cent of water.	Per cent. of fat.	Other solids.	
		lbs.	lbs.		lbs.					
1	July 21-31	21.79	871.5	61.25	34.	3.88	90.5622	.5758	8.8621	Pasture.
1	Aug. 2-7	24.35	487.	42.50	21.	4.31	90.6233	.4590	8.9066	Pasture and tare and oat fodder.
1	" 9-14	22.20	444.	34.25	17.5	3.91	90.6074	.4142	8.9783	Pasture.
2	" 2-7	28.65	573.	48.50	25.	4.36	90.5529	.5549	8.8922	Pasture.
2	" 9-14	28.95	579.	43.	21.5	3.71	90.4830	.7167	8.8003	Pasture and corn fodder.
3	" 2-7	26.35	527.	44.75	24.	4.55	90.5945	.4338	8.9717	Pasture and tare and oat fodder.
3	" 9-14	23.40	468.	36.	18.	3.84	90.5118	.6194	8.8687	Pasture and corn fodder.
2-3	July 21-31	22.92	1835.	131.	65.5	3.51	90.8695	.4485	8.6819	Pasture and tare and oat fodder.

6. Ordinary, well selected cows, that cost $42 each, gave a daily milking of nearly 24.21 pounds during the warmest and driest period of the year, upon good mixed pasture, and 25.20 pounds when green fodder was allowed, or only 1 pound of milk additional for every 20 pounds of such extra food.

7. Lot 1 increased their milk from 21.79 on pasture to 24.35 with tare and oat fodder, and afterwards reduced to 22.20 when on pasture only. Lot 2 increased only from 28.65 to 28.95, under similar conditions, the fodder in this latter case being corn. Lot 3 reduced from 26.35 to 23.40 when changed from tare and oat to corn; yet the highest milking record was with lot 2 on corn fodder.

8. As regards quantity of milk, there is evidence of a better stamp of cows in the case of lot 2, and of the poorest, of the herd in lot 1.

9. While the bulk of cream is not always a point of much practical importance, there may be something to evidence as affected by foods. The largest per cent. of cream was obtained from lot 1 on pasture, and the least from the same cows with tare and oat fodder,—a corresponding quantity of butter having resulted. Lot 2, when in receipt of corn fodder, also increased in bulk of cream, but very largely reduced the proportional quantity of butter. So also, lot 3 reduced its bulk of cream when changed from tare and oat to corn fodder. A combination of lots 2 and 3 gave the second best result in bulk of cream.

10. The very practical point of butter per one hundred pounds milk is very interesting and valuable. A mean of 4.01 pounds for the whole herd under varying conditions is considerably over the mean of British experience, and one half pound more than we allowed when testing at exhibitions. The least was from lots 2 and 3 upon tare and oat fodder, and the most from lot 3 on the like food. The effect of food in the production of more butter per a given quantity of milk is shown in lot 1, which increased from 3.88 on pasture to 4.31 when getting tare and oat fodder in addition, and immediately this fodder is removed the butter yield is reduced to 3.91. In the face of this fact, why is it that another lot of cows (2) reduced from 4.36 on pasture to 3.71 when corn fodder is added? Not only so, but our highest butter yield from lot 3 on pasture and tare and oat fodder, reduced nearly three-fourths of a pound when a change is made to corn fodder. The 220.65 double inches of cream gave 226.50 pounds of butter, or an over-run of about $2\frac{3}{4}$ pounds per hundred.

11. Milk, from pasture only, gave 4.05 pounds of butter, and 4.98 when green fodders were allowed. Corn fodder gave 3.77, and tare and oat fodder 4.12 pounds of butter per one hundred pounds of milk.

12. Twenty-five chemical analyses were made of the skimmed milk from this series of experiments, with the view to check the amount of cream left under the conditions named. Subject, therefore, to the special character of milk from individual cows and from a particular class of cows, and of the fact that chemical analysis is not nesessarily a test of butter production, we have the following notes:—

(1) One half pound (.5028) as an average of fat in milk from which the most cream has been obtained by the best and shortest method—centrifuge excepted—is evidently too much when the object is the most butter, without regard to the poverty of the skimmed milk for any particular article of commerce. The average from the various lots under every condition is as follows:—

	Water, per cent.	Fat, per cent.	Other Solids.
Lot 1	90.5976	.4830	8.9156
Lot 2	90.5179	.6358	8.8462
Lot 3	90.5531	.5266	8,9202

(2) Here is evidence of uniform character of product by total water and solids other than fat, and considerably dissimilar as regards milk fat remaining.

(3) Pasture was more free with its cream than when fodders were used with it, in the relation of .5149 held by pasture, to .5355 held by fodders. The milk from the same lot of cows (lot 2) held very much more cream—.7167 to .5549—when obtained from corn fodder. This is the most marked result of these tests—that one week succeeding another

four cows get 20 pounds of green corn fodder per head per day, in addition to pasture, at once the character of the milk changes and refuses to part with 6½ per cent. of its fat. The milk has not been reduced in quality so much, but seemingly, by some other property has not thrown off its cream so fully as it did when from pasture only. Nearly three-quarters of a pound (.7167) of fat left in the skimmed milk is unusual, and speaks of changed conditions. Further evidence of the effect of corn fodder is obtained in the case of lot 3, where, week succeeding week, the same cows, when changed from tare and oat to corn fodder, increase the fat of their skimmed milk from .4338 to .6194 per cent.

12. Finally, meantime, we gather from these introductory tests, that :

(1) By proper selection of the common grade cows of the country we obtain 5,000 lbs. in place of 3,300 lbs. of milk per summer season.

(2) Had such cows been upon the permanent pasture of this farm, the produce might have been about 10,000 lbs. in place of 7,500 lbs of milk per acre per summer season.

(3) The addition of specially grown green fodders to cows on good pasture, even in mid-summer, does not materially add to the quantity or quality of the milk.

(4) Certain green fodders affect the character of the milk as regards its ability to throw off cream, and

(5) That some green fodders add materially to the quality of the milk.

Milk in Winter without Grain.

Winter dairying is not yet a common thing in Ontario, even individually amongst farmers on any sort of system, and nowhere that I know of in the Province by any plan of co-operation. It requires no far sight to tell of a near developement of the interest throughout winter—subject, of course, to the day of milk having to take a second place to some other specialty in the cycle of events. Meantime we think it to be the duty of this Experimental Station to help the profession in those lines that should stand as guides or warnings for the coming years.

With this view we have carried out two experiments during the past winter that have, we think, proved several things, which, though not unknown in a general way, have possibly not received the same systematic attention that I shall now show.

In January last we selected four well balanced seven-year old Short Horn grade cows from a lot of ten that we had held all summer, and had cost us an average of $42. They calved in March, and were again in calf the following July—thus being from six to seven months gone during the course of the testing. The winter feeding previous to this special work consisted of 3 lbs. bran, 15 lbs. timothy hay, and 40 lbs. of turnips daily per head, being equal to a nutritive ratio of 1 : 5.9.

The cows were divided into two groups, by our best judgment of form and markings as well as by knowlege of their previous records. The groups were changed from one class of food to another, at equal terms from the 28th January to the 7th April, the experiment having thus extended over sixty-four days. Six days were allowed between terms, in order to counteract previous food influence. Every meal of food and milk was weighed, temperature of stables taken, exercise allowed, and the water drank noted. Feeding took place at 6 a.m., 11 a.m. and 5 p.m., milking at 7 a.m. and 5 p.m.

During January, previous to entry for experiment, Group I. weighed 2,322 lbs., and had given an average daily milking of 35 lbs.; and Group II., of 36lbs., with a weight of 2,325 lbs., when six chemical analyses of the milk gave :—

	Water.	Fat.	Solids other than fat.	Total solids.
Group I.	86·143	4·634	9·223	13·857
Group II	86·106	4·736	9·157	13·893

Here is evidence of a very even condition of everything, with a small difference in favour of richness of milk from Group II.

The daily rations per cow for experimentation were :—

A .....40 lbs. turnips, 15 lbs. hay from p. pasture, and 8 lbs. bran,
B .....40 lbs. turnips, 15 lbs. hay of timothy and clover, and 8 lbs. bran.

The hay from permanent pasture was made up largely of meadow fescue, perennial rye, and some red and alsike clovers, and the other hay of about equal quantities of timothy and red clover.

Group I., on ration A, gave a daily milking of 36.6 lbs., and on ration B, of 33.5 lbs., with the following analysis :—

	Water.	Fat.	Solids other than fat.	Total solids.	Ash.
A.....	86·271	4·644	9·085	13·729	·758
B.....	85·900	4·776	9·323	14·099	·739

The cows of Group I., therefore, slightly increased in the quality of their milk from A to B ration, but yet nothing so marked as to override the usual coming and going of any cow under uniform conditions.

Group II, on ration B, gave a daily milking of 35.5 lbs., and on ration A of 36.7 lbs., with the following analysis :—

	Water.	Fat.	Solids other than fat.	Total solids.	Ash.
B.....	86·661	4·192	9·146	13·339	·775
A.....	86·424	4·474	9·102	13·576	·748

Group II., therefore, more distinctly increased in the quality of their milk when changed from B to A ration—as much as twelve per cent., or say one-fourth of a pound of butter to the hundred of milk.

I have not yet obtained the exact feeding value of either of those rations, because no authorities give hay as made up of certain grasses ; but, taking both as equal to the mean of meadow and timothy and clover, their average nutritive ratio is about 1 : 5·3. We may, consequently, anticipate that A will be somewhat higher, but not much. We have, therefore, been handling foods in kind and proportions of more than ordinary importance as usually estimated in practice, as evidenced both by their chemical standing, and evidently also from what the cows have just reported to us. Over all the changes we now obtain the following composition of the milk as influenced apparently by these foods :—

	Water.	Fat.	Solids other than fat.	Total solids.	Ash.
Ration A.....	86·348	4·559	9·093	13·652	·753
Ration B.....	86·281	4·484	9·234	13·719	·757

And the milk produce for the whole course stands thus :—

Ration A .....23,080 lbs., or 36 1-16 lbs. per group.
Ration B .....22,450 lbs., or 35 5-6 lbs. per group.

Group I. entered with an average cow weight of 1,179 and closed at 1,222 lbs. Group II. began with 1,150 and closed with 1,186 lbs.

The cost of production may be placed thus, per cow :—

512 lbs. bran @ $12	$3.07
960 lbs. hay @ 10	4.80
2660 lbs. turnips	3.55

Making the 1,135 lbs. of milk per cow equal to 1 cent per lb., or nearly 2½ cents per quart.

We are now in a position to sum up, and ask what may be learned from these facts.

The prominent feature of this experiment is the uniformity in every respect of the milk from the four cows during mid-winter, upon food differing only to some extent in the quality of the hay allowed. Hence we may ask if *dry fodder* has much to do with any changes in the cow economy when giving milk, while she also gets a large proportion of such succulent and nutritions things as roots and bran.

Another indication of some importance is the high feeding value of our every day crops—turnips, hay and wheat bran. By a mixture of 40, 15 and 8 lbs. of these respectively per head per day, cows were not only enabled to keep up the full flow and quality of their milk, but to uphold condition until about one month of next calving.

While we did not necessarily work for an increase or even the maintenance of dairy products with cows so long after calving, it is clearly a point of very considerable importance to note how easy, comparatively, without grain proper, it has been to get milk all winter. We cannot overrate the significance of this fact as against the many examples of special cow records with so much and so many kinds of grain in these competitive times. If it shall be said that two gallons of milk per day will not pay when it costs about 9 cents and retails at 24, we have yet to learn where the profit goes. It is no creditable argument to say that this quantity of milk is equal to the *summer average* of all Ontario, but it does indicate how much could be done in winter even with the present class of cattle that are timed for summer use.

Our farmers, then, need not think of winter dairying as a system demanding of necessity much grain, and upon this really valuable question I shall have pleasure in submitting, at an early day, another experiment conducted at the same time as the to going.

Winter Milk with and without Grain.

Cows, in the ordinary course of management, are not the best agents to test the *exact* effects of foods on dairy products, because of their incoming and being in calf—so irregularly and so long, often. We do not know what, and how much, to allow for these interruptions, and for the growth of the unborn calf. Last year Professor Grenside made several experiments in spaying cows and heifers, as explained in the Annual Report. We took advantage of this and used one of the cows for this experiment.

She is a common Canadian grade, eight years old, had her last calf in March, 1886, and was spayed on September 6th following. This cow was a natural milker, and required no education to make a show, hence we have much satisfaction in her conduct since altering. After this somewhat severe change, and up to the end of January, 1887, she gave a regular daily record of 22 lbs., and of 19.6 lbs. during February, just before being set aside for these tests. During February her milk gave the following analysis :

Water.	Fat.	Solids other than fat.	Total solids.
86.363	3.994	9.141	13.135

Hence, not a rich milk ; the food then, also, being our general ration of 3 lbs. bran, 15 lbs. hay and 40 lbs. turnips, *i.e.*, 1 : 5.90 nutritive ratio.

On March 1st, six days previous to actual commencement of testing, and just one year after calving, this cow was put upon a daily ration of 18 lbs. bran, 9 lbs. timothy and clover hay, with 30 lbs. sliced turnips, all mixed and dry. This was continued for twenty-eight days, when, after an interval of six days, the ration was changed to 10 lbs. of a mixture of equal weights of ground pease, oats, barley and corn, with 9 lbs. hay and 30 lbs. sliced turnips, as before, and continued for other twenty-eight days.

In this arrangement our object was to test the effects, through such a steady animal source, of a large quantity and similar value of bran on the one hand, and, on the other, of the mixture of grain that has hitherto with us given the cheapest and one of the most rapid results in fattening store steers.

With the bran regulating ration the daily milk was 18.8 lbs., and of the following character by eight analyses :

Water.	Fat.	Solids other than fat.	Total solids.
86.952	3.918	8.760	12.678

With the ration regulated by the mixture of grain we had a daily milking of 19.5 lbs., and this analysis :

87.255	4.718	8.037	12.755

The nutritive ratio of the bran diet is 1 : 5.04, and of the grain mixture 1 : 5.67. Details of management are similar to the four cows previously recorded. The mean temperature of our new stables was 44° for February, 44° for March, 51° for April, and 62° for beginning of May.

We learn meantime from these :

(1) That a very large daily consumption of wheat bran—about two and a-half patent pails full—with roots and hay, giving the comparatively high nutritive ratio of 1 : 5.04, did not produce either an equal quantity or quality of milk, as did the same value of a mixture of grain with similar roots and hay. Indeed the milk was reduced in quality 17 per cent., which would be equal to about one-half of a pound of butter per hundred of milk ; or, perhaps it would be better to say that the mixture of grain raised the quality of the milk 20 per cent., as the normal condition of it previous to experiment was just about equal to that got from bran-feeding.

(2) That the highly concentrated and indigestible character of the bran of wheat, now so well cleaned of flour by the new milling process, can evidently be fed in over quantity to milch cows.

(3) That, nevertheless, the shell or skin of one grain, called wheat, was able to maintain animal life and waste, and at the same time give daily products only 2 cents less in value per day, a fact of immense importance in what may be termed a wheat-dairying country.

Bran in Fattening Store Cattle

In previous years we have tested the value of different kinds of grain separately in the fattening of stores, but never bran thoroughly against any of them, or a mixture of them. The prominence now given to the bran of wheat in feeding milch cows decided the previous experiment, and in association with it we conducted another last winter with exactly the like kinds of food, in fattening store steers.

Eight animals were thus handled, all being Short Horn grade steers two years old—three only of which could be held as tops of their kind, and the others but very ordinary specimens. They were got in October, 1886, and put up to good stall feeding until the beginning of the test on 28th February following. The lot was made into two equal groups, balancing everything as usual to the best of our knowledge, and changing during periods of the 68 days ending 7th May.

The two rations per head per day were :—

A.....18 lbs. bran, 9 lbs. timothy and clover hay, and 30 lbs. turnips.
B.....10 lbs. of equal weights of ground pease, oats, barley and corn, with 9 lbs. hay and 30 lbs. turnips.

Upon the grain (B), all over the two periods, the average animal entered with 1,347 and came out with 1,371 lbs.

Upon bran (A), all over the same periods, the average entry was 1,330 and the closing weight 1,382 lbs. per head.

These brief statements of the whole experiment are so astonishing that recapitulation in another form is desirable.

Group I. on grain began at 1,334 and closed at 1,360, having increased only 26 lbs. per head in 33 days. When changed to bran the average animal increased from 1,360 to 1,403 lbs. in 35 days.

Group II. on bran started at 1,300 and closed with 1,361, thus increasing 61 lbs. in 33 days, and when changed to grain the average animal ran from 1,361 to 1,382 in 35 days.

Altogether, then, there has been a mean daily per head increase, from all sources over all the period, of over one (1.10) pound to the live weight. Grain gave a daily weight of two-thirds (.69) of a pound, and bran fully a pound and a-half (1.53) per head daily.

Animals were in good health and had no trouble, except one that bloated thrice when on bran, and hence would be an item asking for credit to that ration.

We have never had the same experience with a lot of stores. During the last eleven years with us the average daily increase to weight by many kinds of feed has been 2.03 lbs., the lowest 1.60, the highest 2.70. Besides, on almost an exactly similar ration to this grain (B), we have obtained in past years a mean of 2.25, so that we are in trouble in having to account for the unusual circumstance of the *general bad doing*, without reference to the specialties meantime. One thing is evident in this experiment, namely, that the conduct of each group has been very uniform, but all over there was a decidedly under-average lot of cattle. Quality was wanting in the majority, and few were hearty feeders. Nevertheless there was uniform health, and so far as regards agents for experimentation the conditions were precisely alike, with the reflection that treating such a class of animals to a variety of things would most likely be better for them, as against one kind of food in abundance.

The nutritive ratio of the bran diet is 1:5.04, and of the mixture of grain 1:5.64, which, though not always necessarily the best evidence of the feeding value, is a guide, and indicates in this case that the hay and roots with the bran was about 12 per cent. richer than the other ration. The two may be placed for all practical purposes at equal market value, and thus we have an increased interest in the competition.

That growing cattle life, specially set aside to produce beef during winter, should be more than doubled in added weight by the consumption of 18 lbs. of wheat bran as against 10 lbs. of a mixture of our best coarse cereals and the pea, seems hardly possible from a farmer's reasoning. The point is not only one of considerable importance; it is one of physiological interest, the more so as we have had the milking cow and the beefing steer giving such different results. Take the latter fact first of all:—

As shown in last chapter, a spayed cow—an agent of the very best kind by the way—not only gave somewhat less milk on 18 lbs. bran per day, but that milk was 17 per cent. less in butter fat than when she got the 10 lbs. of the mixture of grain in question.

Is bran, then, by its higher concentrated and less digestible character, better adapted to produce fat and flesh than milk and milk fat? It has most unquestionably said so in these tests, and while further prosecution of the enquiry may alter results to some extent, the facts so far are too prominent to be set aside as belonging to any unusual circumstances.

We do not enter upon the chemical bearings of the experiments at present, because Professor James has not yet completed analyses of fodders and the manure obtained.

It will be matter of much interest to all feeders to note that while the cow ate both rations freely and left nothing to re-weigh, the steers did not consume all the bran ration, but left an average of 2½ lbs. per head per day; at the same time the well-balanced grain ration was cleaned up by the steers, and possibly they would have taken more. It appears, then, that fattening stores cannot make use of more than 15 lbs. bran in association with 30 lbs. turnips and 9 lbs. hay daily per head.

But further, the cost of production should not be overlooked even in an introductory test. In a former experiment we ascertained that bran was not only able to maintain animal life and waste, but to give dairy products only two cents less in value per day in correspondence with the same market value of the grain ration. Now we have fattening steers that not only gave 100 per cent. more daily increase, but did so at one cent per head less cost when the food was regulated by bran as against grain.

We close now with the memorandum that apparently the exact place of wheat bran as food for cattle is not clear enough to justify any one in an irregular and indefinite use of it, for :—

1. Is its general chemical standing yet a steady thing?

2. How much of its properties is assimilated by the animal system in different cases?

3. Is it really of more value as a fertilizer after passing through the animal than it was previously?

4. Is it always better dry than wet when fed?

5. Should it be mixed with other food, and what kinds?

6. What is its place in association with pasture?

7. What are the maximum economical quantities in different cases?

The Marking Power among Cattle.

I think, had this station kept exact notes of the varieties in cattle-life obtained during the last twelve years, much interest would have gathered, and may-be considerable every-day value realized as well. I make no apology to the Government or country for the want hitherto of any systematic notice of this branch of our work, as, with many other duties and a diffidence in submitting anything on a subject so often uncertain and so seldom handled even by experts, excuse may reasonably be overlooked or allowed.

But to-day, the day of experimentation, and of much literary impudence everywhere, we do not fear to break new fallow. Of course I have my own private jottings to fall back upon, and, as all interested men know, the field of observation here has been varied and pretty full for one farm.

I call the subject *marking* power, in hair and skin—not prepotent, not heridity, nor atavic power, which, though likely more correct scientifically, are not the best for my purpose at present.

1. One rather remarkable and practically important thing in our experience has been the absence of any bad marking of breeds amongst themselves as pure breeds, where cows are herding together in all seasons, and under all other circumstances of the coming and going of cattle there would seem to be risks of this kind. For example, no Devon, or Galloway, or Aberdeen Angus Poll has taken the white face of the Hereford, the white splashing of the Holstein, or all throughout the one of the other. I name these breeds specially, because they are usually those that hold a colouring in their characteristics and points, and are judged accordingly. The explanation of this fact is evidently that of familiarity of company not having the effect usually following a sudden appearance of a differently coloured animal either during service or at a certain stage of the growth of the *fœtus*. I believe more bad marking arises from cows going to exhibition than anything else.

2. We have also had most clear evidence of the superior marking power of the male over the female when both are pure or thorough in their breeding. Breeds even that do not *profess* typical markings, such as Short Horn, Jersey, Guernsey and Ayrshire, have invariably followed the sire both in male and female issue. White is undoubtedly the purest, the strongest and the most reliable of all colours, if it is a colour at all. Very dark red, or even black and yellow Ayrshire cows, yield to a white sire of their kind, and if he be spotted red and white, the very clouding of his red and white is given through a white cow.

3. In cases of crosses by pure-bred males and grade cows, we have had extensive examples of marking. I know of few instances among hundreds where the sire did not impress himself strongly. This, of course, was more exact in cases of an uniform one-colour, such as Devons and Polls against Hereford and Holstein. Yet even in the latter, the splashing of white and black has been uniform as regards position and general area,

though not precisely the outline in every instance. Very striking copies of colouring are got from the Holstein—so precise in hair and skin by the first cross with ordinary grade cows that no expert could tell them from thoroughbreds.

4. Another feature of this study is the individual character of the male or female as bearing on the power of either to mark their progeny. If a sire be less prominent in his nervous organization in proportion to his frame—having a more effeminate head, wide forequarters and less prominent spine, there will be more cases of the cows affecting colour. Hence beefing breeds, so-called, are not so persistent in marking as dairy breeds proper, because their nervous development is much less in relation to the whole body.

5. We have had no clear examples of bad marking by breeding the same cow to different classes, where it might be expected that the effect on the cow of the first, say a Galloway sire, would be noticed in the marking of the second calf, say by a Short Horn.

6. What may be called impotence of recurrence has also come into our experience—that is, where the cow possesses the colour of the old or original cattle from which the improved breed of her own kind has sprung, and which, in her case, is simply a reversion; she will invariably, nay in almost every case, give a calf following the sire, which is, of course, very different in colour and the type of the improvement in question. This is true both in Short Horn and Aberdeen Angus Polls. We have an entirely red thoroughbred Aberdeen Angus Poll cow—not a black hair anywhere, and her skin nowhere dark except a slight mottling of the nose. With the bull of her kind this cow has always given a most typical black calf in all the hair, and skin, and moss that belong to the doddies. I believe the impotence would be equal were the sire red and the cow red. The law in this aspect seems to "hark back," and not to tie with immediate relations, so that while this red cow undoubtedly took her colour from a far back source, she is not of herself able, nor would a red bull of to-day likely be able to mark his colour, even when both parents are red.

7. But we have also several examples of marking that "throw back" only when between parents of the like class, and yet that are true to the sire when the dam is a grade. This has been a point in our Jersey breeding here; most of our pure-bred calves of this class are spotted white and otherwise irregular in colour, but those from crossing with common grade cows are whole coloured, as the bull is. It cannot be said that the Jersey cows have directly influenced the parti-colouring, for they are themselves whole in colour, and so the question is either one of an abnormal blending of blood, or of superior power on the part of the bull when the cow is from no particular source.

Finally we learn the following in regard to the marking power of different breeds of cattle: —

(1) The cows of many breeds herding continuously together do not endanger the special marking of the progeny of any of them.

(2) The strongest colour in respect of influence upon progeny is WHITE.

(3) Whole colours, or one colour, are more certain of exact perpetuation than a mixture of them.

(4) Colouring is more certain of being perpetuated when the sire has a marked nervous organisation.

(5) Improved breeds, or those that have been specially bred from various sources to attain certain results, are not so decided in marking their progeny.

(6) Dairy breeds are more powerful in marking than those disposed to make flesh and fat.

(7) There does not seem to be much tendency to bad marking by breeding the same cow to bulls of different breeds.

(8) A cow or bull having the colour of the original type of what is now an improved breed, with a very different colour, will produce more of the improved than of the old colour.

Some Suggestive Creamery Notes.

During the close of the recent severe drouth, in the two first weeks of August, we tested the butter value of milk and cream from nine distinct sources on this farm for comparison with the average received from the patrons of our creamery, which is managed on the ordinary gathering plan, and also in connection with the very dry condition, and shortage of pasture.

1. Our creamery patrons are instructed to set milk in cans, 20x8 inches, and keep in water not over 50° ; skimming is done by them, and the cream valued by the "Comp Oil Tester," purposely at irregular intervals, and paid for accordingly. The standard for one pound of butter is one inch on the cream can, 12 inches in diameter, or 16 gauges or ounces on the oil tester.

2. We took some thirty milkings, and portions of milkings, from Short Horn, A. A. Poll, Hereford, Devon, Holstein, Ayrshire, Guernsey, a spayed common Canadian cow, and Short Horn grades, on our permanent pasture plots—in all 13 cows. The milk was set in 2½ inch test tubes and iced water, at from 40° to 45° for twenty-four hours, so as to copy as nearly as possible the conditions of the creamery patrons.

3. It is not contended that conditions were exactly alike on an average, nor that our cows under all the variety of circumstances were alike to the 800 which supplied our creamery, but it is plain that large averages can be checked, and material of this sort gathered year by year for reference and ultimate practical guidance. It is to be regretted that our Jerseys and Galloways have not contributed to this experiment, as we expect they will do for another in the course of a month.

4. The per cent. of cream from all our sources was only 11 on an average, cows being on pasture and getting 3 lbs. bran per head daily, those on permanent pasture excepted. Classifying these sources, we have a mean of 12 per cent. from the three prominent beefing breeds, named Durham, A. A. Poll, and Hereford ; from the two heavy milkers, Holstein and Ayrshire, 7½ per cent. ; from the two acknowledged butter breeds of the number, Devon and Guernsey, 12½ per cent., and from grades, 12 per cent. cream. The separation of cream was very indistinct in the cases of Devon and Ayrshire. The highest per cent. was a mean of 18.8 from the Guernsey, and the lowest 6½ from Holstein.

The oil tester showed the following quantity of butter fat, namely, ounces per inch of the cream can, 16 being the standard for one pound of butter :

Durham	16⅓
A. A. Poll	17
Hereford	17
Devon	11
Holstein	7
Ayrshire	10⅓
Guernsey	17
Spayed grade	15⅓
Grades on permanent pasture	16⅙
Mean	14⅛

6. The mean of 293 tests at the creamery during the same period was 13½, and for the previous part of the season 14.

7. The first thought upon these facts is the *cream lowness* of all the make of 36,000 lbs. of butter at our creamery up to 17th August. The cattle of the district are principally Durham grades, with a touch of Devon, Hereford, Ayrshire and Galloway here and there. But is it particular breed, or management, or a tester too high for our conditions that has regulated the 13½ in place of giving 16 gauges? My answer partly to this is the

check from the thoroughbred and grade cows of the College. They have not, as a whole, even reached the standard of the oil tester, but, excluding the Devon, Holstein and Ayrshire, they gave 16½, which may show that the area of the cream-can has been based upon a different source, or sources, or conditions, of milk from those of the creamery supply.

Another thought is the character of the skimming by patrons as a whole, which may have been *deeper* than what we did, for of course we took cream only. Yet, as I have shown, three of the pure breeds gave as low as 9½, or actually 40 per cent. less than the creamery. Where then lies the actual check 'tis difficult to say. It is proper to note that in Durham, A. A. Poll, Holstein, Guernsey and grades we have cows not used in any previous testing here.

9. Taking the standard of 16 on the oil tester as a base of comparison, it results that, irrespective of quantity of milk and of quantity of cream, the three beefing breeds, Durham, A. A. Poll and Hereford, have given one ounce over the pound; the two heavy milkers, Ayrshire and Holstein, seven ounces under, and the two butter breeds, Devon and Guernsey, two ounces also under the standard for a pound.

10. But, with quantity of cream added to butter value by the method adopted, there results this very suggestive list:

Guernsey	30	per cent.	*over*	standard.
Grades	14	"	*under*	"
Hereford	18	"	"	"
Durham	20	"	"	"
A. A. Poll	25	"	"	"
Ayrshire	65	"	"	"
Devon	70	"	"	"
Holstein	82	"	"	"

Hence, if the standard represents 3½ pounds of butter to the hundred pounds of milk, the Guernsey would produce 4½, and the Holstein two-thirds of a pound per hundred.

Note.—Some readers may have to be told that an "Oil Tester" is a recent invention by which cream is subjected to repeated churning and heating, so that in the course of three hours there is a very distinct separation of the curd, the whey and the fat or oil; hence the name "Oil Tester." It has also to be noted that this almost pure melted fat or oil is much less in bulk proportionately to its milk, or to the cream from the same milk under ordinary rising,—as much possibly as would raise the Guernsey from 4½ to 6, and the others correspondingly.

Improved Temporary Pasture and Milk Production.

Some may think we have said enough about pasture during the past five years, and that experiments are now conclusive as to what can be done for its improvement. It seems, however, to be desirable to close the season with some additional facts and under new aspects.

Hitherto our work in testing mixtures of grasses and clovers has been termed *permanent* pasture, because the object is the maintenance of such a crop for many years, perhaps even for all the time that several generations can remember, of which we have examples in older lands. But, as it is difficult to grasp the full significance of what goes so far away from our yearly practice, we shall look at this class of pasture as if it had been connected with an ordinary rotation of crops, where, after two years' hay there is usually two or three years' pasturing before breaking up for another succession. Thus we hope to bring home to everybody one of the duties of the day in connection with Canadian dairying.

We seeded in 1884 without a grain crop, and took hay the same year; it could as well have been with a crop of grain. In 1885 we grazed and obtained 7,800 lbs. of milk per acre; it could as well have been another crop of hay. We also grazed in 1886 and

obtained 6,670 lbs. of milk. This, therefore, would be a system of one year's hay and two years' pasture, applicable to some soils and grain-growing districts. The result here would have been a mean annual milk crop of 7,235 lbs. per acre, with $61 for butter and skim milk. Had the same land been laid down to timothy and clover, and an average of the Province realized (that is 1,300 lbs. of milk per acre), the revenue would stand at $11 per acre. Against the mixture of grasses is the sum of $3.50 as the difference between $5 for seed and the ordinary $1.50 of timothy and red clover, for there should not be any for management and manures. Hence, during two years, the improved pasture gave $96 per acre over all the profits of the ordinary cultivated runs for Ontario cows.

But, possibly, neither of these pastures are at their best in three years, and a longer rotation may be desirable.

The same fields were kept in sod during 1887—the driest season in Ontario for many years. As part of good management in continuing temporary pasture, as well as permanent, under heavy stocking for three years, we applied $22 value of manures per acre in preparation for 1887; hence we must debit with 10 per acre as a proportion for that year, in addition to the extra cost of seeding. As this is our closing point at present, take the following statement:

		lbs.
Milk per acre in 1885		7,800
Milk per acre in 1886		6,670
Milk per acre in 1887		4,010
Yearly average		6,160
Value of milk per acre		$156 00
Extra cost of seeding	$ 3 50	
Manures	10 00	
Allowance for extra management	3 00	
		$ 16 50
Net revenue for three years		$139 50
Ordinary pasture for same period		33 00
Difference in favor of improved pasture		$106 50

Or $35.50 *better*, per acre per annum.

The account is now closed, and sod may be broken for a crop of pease or oats.

What more need be advanced meantime? If it is necessary that a sample of the soil, the pasture, the cow, the milk and the manure should be submitted to all our farmers in order to convince and convert, then our national future in dairying will be a slow and third-rate one indeed.

With the average farm of 150 acres in Ontario in possession of ten acres of such improved temporary pasture, the annual difference would amount to about $350, and consequently to about $15,000,000 for the Province.

It is a pertinent fact in nearly all civilized agriculture everywhere—in older times as well as now—that propitious conditions in nature make men indifferent and unprogressive; in other words, they are too well off. Unquestionably our Province is full of many fat things, and while it may be somewhat uncharitable to draw an inference in this connection, and knowing how easy it is to find fault, I desire most seriously to say to our farmers that individual and Provincial co-operation and emulation are as much desirable as the wider lines of international union. For the sake of self, then, let us have something approaching to 6,000 lbs. of milk per acre, in place of the 17½ lbs. per cow per day and the 900 lbs. per acre per annum. (See Mr. Blue's paper to Dairymen's Associations, 1886-7.)

SOME FACTS AND EXPERIENCES IN PREPARATION FOR WINTERING LIVE STOCK.

General Food.—Our regulating food for all cattle is prepared thrice a week, and consists of 40 lb. pulped turnips or mangels, 15 lb. cut hay and 3 lb. of bran per head daily on an average of kind and age. These foods are mixed in a heap about four feet deep, and used before much heating or during the sweet stage of fermentation, which is usually when the temperature reaches 70°. The nutritive ratio of this mixture is 1:5.9, and the market cost 16 cents per head per day; the cost to the farmer is about 9 cents. Water is given about 40°, and the stable is never over 50°, with proper ventilation. The breathing space for each animal is about 900 cubic feet.

Cut Hay.—A saving, estimated at 12 per cent. in feeding horses and 30 per cent. for sheep, was realized last winter with cut hay. The animals cannot leave any amongst their feet, and they eat more of the rougher portions.

Steam Power.—A 17 horsepower portable engine, with a 20-inch French burrhstone mill, grinds 30 bushels of pease or barley in one hour at a cost of one cent per bushel, including every possible cost. The same power drives hay-cutter and root-pulper both at the same time, and in less than two hours prepares the food named in first paragraph, being 2,000 lb. hay and 6,000 lb. roots. The cost of this is 55 cents per ton, or one and one-half cent per head of cattle daily, including interest on cost of engine, fuel, tear and wear, oil, engineer, two hands at hay-cutter, two at pulper, and two at mixing the food.

Ice.—For creamery and college use we harvest about 400 tons every year; placing a full value upon everything, including teams, men and student labour, and, having had to haul nearly one and one-half mile, ice has cost us 60 cents a ton.

Manure.—With an uncovered court, where cattle, horse, and sheep manure is regularly mixed, where cattle are exercised every day over the manure, where gypsum is systematically used in cattle stalls, where all surface liquid is caught in a tank, where drains from stables take liquid to tank also, and where the liquid can be applied to the manure pile as required, there is during winter practically no waste by evaporation, washing away, or over-fermentation. But much snow lying long retards proper decomposition of materials and necessitates hauling to piles in fields in winter, or turning over in the yard in early spring so as to induce rotting. We made three tons of farmyard manure per day, and on putting stock out to grass on 10th May our court had given us the following quantity and value of fertilizing materials, in association, of course, with humus, from 550 tons sent out in the rough from the different animals :—

	Lb.		Value.
Potash	8,800	@ 5c.	$440
Chlorine	735	.....	....
Phosphoric acid	4,950	@ 6c.	297
Nitrogen	7,700	@15c.	1,155
Soda	3,300	.....	....
Lime	15,400	.....	40
Magnesia	1,650	.....	....
Sulphuric acid	5,500	.....	....
Silica (soluble)	12,100	.....	....
	60,135	.....	$1,932

Sulphuric acid and lime are more than an average, in consequence of using gypsum every day as explained. Valued chemically, these 60,135 lb. of fertilizers are worth at least $2,000, irrespective of the humus and of those materials usually not valued as *direct* fertilizers on the market. One-fourth by weight is actually lime, and this to be used upon soil abounding in the mineral itself, where there is at least one per cent. of it; one-fifth is soluble silica, and of that our average field contains a sufficient proportion; one-seventh is potash, and when the soil of this farm has only about ·086 per cent. (the

twelfth part of one per cent.), its value can be appreciated; one-twelfth of the manure is phosphoric acid, so that its importance will be seen in a soil containing ·040 per cent. of that material. Of chlorine the manure has an abundance proportionately, as we offer so much salt to all our animals. As nitrogen with phosphoric acid and potash are the main elements of cultivated plant life, I think it will surprise some to note the large amount of nitrogen we are receiving per farmyard manure, one-eighth by weight of the whole. And who will contend that thus, in association with other fertilizers, it is not very much more valuable and safe than by the use of nitrate of soda, or other special agency? Nitrogen in farmyard manure is thus equivalent to 34 lb. per acre per season of our actually cropped area, or 24 lb. for every acre under cultivation. We have no exact experiments to show how much our average cropping removes annually, but from experience elsewhere it cannot be over 30 lb., so that we seem to be accumulating rather than losing, and I believe this to be the fact.

Altogether, then, on the question of our valuation of manure in previous years it appears that $3.50 per ton, as above, is $1 more than what was asked in connection with the fattening of store cattle.

Winter Crops.—Farmers are harvesting something every day, and as few of us are in the habit of estimating winter products in correspondence with those of summer, we give the following as a safe under-calculation of what we realized during 1886-7 in connection with a cultivated farm of 350 acres, or perhaps correctly of 250 acres, that gave hay, straw, grain, and roots. Take both areas:—

	350 acres.	250 acres.
Thoroughbred cattle, 15 head	$4 50	$6 00
Thoroughbred lambs, 50 head	1 10	1 50
Wool from seventy head	30	40
Pure bred swine, 12 head	45	55
Fattening cattle, 12 head	1 75	2 50
Milk from 12 cows	1 40	1 90
Manure from 75 cattle, 14 horses, 80 sheep, and 5 swine.	4 25	6 00
Gross revenue per acre for winter	$13 75	$18 85

The Grazing of Sheep on Improved Pasture.

We have been trying for twelve years to impress our farmers with the fact that one of the most prominent weaknesses of Canadian agriculture is unappropriated land and non-production of wool and mutton. The country is really doing nothing in this respect in correspondence with others, and what we could do by improvements, what by ordinary management, and what we are only doing now, may be thus illustrated:—

	Canada annually.
Present wool and mutton	$ 9,280,000
By ordinary attention	20,000,000
By improvements	30,000,000

These have no reference to production of pure breeds as a specialty, but the use of them with the common sheep of the country in order to realize annual crops from our so-called comparatively worthless possessions, in addition to pasture connected with arable.

If the 3,793,800 acres of ranches already rented in our North-West Territories are equal to the ordinary hill grazings of Britain, they will maintain 1,250,000 head of sheep in place of the present 75,000 cattle, 6,318 horses and 16,431 sheep (see Dr. McEachran's report just issued). These represent about 400,000 sheep; hence, were these natural runs improved, it is safe to estimate they would carry over 2,000,000 head, in addition to cattle, and would thus stand at an annual revenue of $8,500,000 in wool and mutton alone.

We are not believers in an equal revenue being realized in wool and mutton by any breed per acre from our best cropping soils, as compared with, for example, dairy products, and so the object of the experiment now to be submitted was to test the ability of improved pasture on such soil to maintain so many sheep per acre per annum, and compare with cows and store cattle.

For this purpose we chose a four year old acre of permanent pasture, the make-up, condition and management of which are now familiar to all interested. Divided field in two equal parts, and on 5th May put on five shearling ewes—Oxford, Shrops and Cheviot—that weighed an average 107 lbs. On 23rd May put two others to keep down roughness of pasture, that averaged 139 lbs. As these seven sheep were unable to do this, we added seven stock rams on 9th June, thus making fourteen in all. Of course these were kept separate, and rotated from field to field. Removed the rams on 2nd July, and on 3rd August also removed the two extra ewes, when the extraordinary dry season was telling. No grain or extra food of any sort was allowed.

At this critical time of grazing we made the following observations on appearance of the grasses and clover that composed the pasture in question :—

Meadow Fescue	Most plentiful of any.
Alsike clover	A large quantity.
Canadian blue	Considerable quantity.
White clover	Medium in quantity.
Orchard	Medium.
Timothy	A good average.
Red top	Good.
Red clover	A small quantity.
Italian rye	Very little.
Fall oat	Very little.
Perennial rye	None.

The experiment with these sheep was closed on 1st October, as they were required for distribution to service. At this time the pasture looked well, a good bite having been left ; hence other sheep were put on and grazing continued until snow came, on 20th November. It is not necessary to take advantage meantime of this subsequent depasturing.

The average grazed during the term from 5th May to 1st October was fully seven head per acre ; the increase to weight was 22 lbs. per head. This is the statement ; what does the Canadian farmer think of it ?

Some will say, " Only $7.00 value of wool and mutton per acre per annum after all." True in that respect, though the animals were pure bred, and up-keep of vigorous growth their case and not one of immediate consumption. The grazing of sheep is not usually looked upon as worth more than $1.00 a summer in Ontario, but unfortunately the average is not a very bright thing, and usually requires one acre per head.

The correct criticism is to compare the result with something more familiar and under equal conditions. We had this immediately alongside the acre in question as given in Bulletin xx. There during 1887, 4,010 lbs. of milk were obtained per acre, and consequently a value of about $40. Then, again, it is usual to say that from four to five sheep are equal to one cattle beast upon pasture ; in this comparison, therefore, we have this pasture representing actually one and half-cow per acre.

But apart from these facts, we are gratified in placing on record for the use of our people the continued prominent good conduct of our mixture of grasses and clover under very severe circumstances, as a piece of temporary or permanent pasture in association with crop-growing. We have now demonstrated beyond doubt that such pasture produces milk, beef and mutton in quantity three times more than the present average of the Province of Ontario.

V.—THE MECHANICAL DEPARTMENT.

To William Brown, Esq.

Dear Sir,—In accordance with our usual practice of giving a general summary of the year's work done by the Mechanical Department in connection with this institution, I beg to submit the following statement :—

Naturally the scope of my report resolves itself into two parts—first, as to the instruction imparted to students ; and second, as to the work which we have accomplished during the year.

Our first object in dealing with new students is to make them thoroughly familiar with the names and uses of the various tools. The hour devoted to this purpose is, in my opinion, the most important of the day, for by this means they acquire a general knowledge of the trade which they could not get if they were simply set to work upon whatever there might be to do at the particular time for which they were assigned to my department. In fact, in this hour set apart specially for instruction, they are able to learn many things which they could not learn otherwise perhaps in the whole course of their stay at the institution, simply because they might not be called upon to do such work.

As many of the students come entirely ignorant of the purposes for which various tools are used, it is necessary in teaching them to begin with the very rudiments of carpentry. For instance, before they can plane a board they must be told that the jack-plane is the proper tool to use first, and it must be pointed out to them next, if it is necessary, to "try a board up." They are given the try-plane and shown how to use it, and finally they are instructed as to the use of the smoothing-plane. In the same way the students are taught with respect to the uses of the different saws ; they are also shown how to set and sharpen such tools. Then they are instructed in the different terms of carpentry, such as gaining, mortising and tenoning, and shown how to beat out a mortise. The course likewise includes lessons upon the use of gauges and squares, and special attention is paid to the framing-square. When they get farther ahead they receive instruction as to the comparative strength of different kinds of wood, as, for instance, how much stronger a piece of ash is than a piece of pine, etc. In this way the whole school is gone over, each batch of boys as they are allotted to the department. By such instruction, together with the practical experience they obtain by actual work, they cannot fail to gain a knowledge of carpentry and of handling tools which must prove valuable when they launch out as farmers for themselves.

As to the work accomplished, it would serve no purpose to specify all the odds and ends which constitute a large part of the work done in this department in the course of a year. That for the year ending September 30th, 1887, does not differ from the work of previous years, in that it has to a great extent consisted of repairs and alterations. For example, considerable repairs were made in connection with the bull-sheds, the wind-pump, cattle stables, green-house, and College building. All the implements were overhauled and repainted ; all the doors in the new barn having swollen, were taken off and planed down to fit ; the grape-vine fencing was put in good order ; a block and tackle erected in the ice-house for raising blocks of ice, and boards supplied for enclosing the ice as it was stored ; the posts about the old stable court taken up and removed ; and, in the fields, the pumps and water troughs received attention. Such is an outline of some of the repairs which occupied our time.

In the way of new work undertaken and carried out, there was the erection of a cover over the rain and drain guages ; the building of a small house at the College for the purpose of holding the fire-hose, and the construction of reels on which to wind this hose ; the building of a coal-house at Prof. Brown's residence ; the laying of about twenty rods of four-foot sidewalk from the stables to the carpenter shop ; the construction of a number of pig troughs ; the enlarging of granaries ; the erection of feed boxes for loose cattle, of harness presses behind the horse stalls, and of hay forks over the sheep stables. The students also assisted in the erection of a patent rack lifter.

Perhaps a piece of fancy fencing put up along the south lane in front of the stables is worth a line in passing. It extends about four rods, and is made with high and low pickets alternately. There are four gates, and a gate of similar construction leads from the cattle court. The whole is painted a drab colour, and looks very handsome.

Considerable work was done in connection with the sheep quarters. A portable fence was made for the purpose of dividing the sheep yards; part of the stable was partitioned off into pens for breeding purposes; a room was fitted up for storing wool; a passage formed along the whole length of the sheep stables, which passage, together with the wool room, was floored; a large number of feeding racks were made, as was also a rack for the drying of sheep after being washed prepatory to shearing.

As invention progresses, the work of the farmer becomes less and less laborious, and machinery is made to do work which was akin to slavery in former days. The machinery in use in connection with this institution is naturally extending every year, and the work of setting it up and keeping it in repair has grown to be quite an item among the duties of the mechanical department.

Early in the year we erected machinery for driving the chopping mill, but afterward this was altered to form a part of the general system subsequently introduced. There were also a counter shaft and pulleys put in for cutting hay for the horses.

Later on in the year we built an engine house, with cedar block foundation, 20 x 30 feet in size, with 16 feet posts, at a distance of 50 feet from the barn, as a precaution against fire. After a good deal of planning and consultation with yourself and Mr. Mills, we decided upon a system which was recommended by the Advisory Board, viz., connecting with the barn machinery by means of a wire rope, $\frac{5}{8}$ inch in diameter, over two large grooved wheels, one placed in the engine house over the engine, and driven from the engine wheel by a band wheel 40 inches in diameter. The wire rope now communicates the motion to counter shaft inside the barn, and this counter shaft has a pulley to connect with counter shaft with pulleys to drive the several machines, which are, turnip pulper, straw cutter and chopping mill. These three machines are driven from the third counter shaft. There is on the second counter shaft a gear core wheel communicating motion by pinion and counter shaft for the purpose of driving separator. This last shaft connects to a jack, which can be placed in several positions on the floor, so that the separator can reach the different mows. This system gives splendid satisfaction so far as motions are concerned, but the wire rope does not work advantageously for the reason that the wheels were bought second hand and are not true. To make this perfect we will require two grooved wheels between the driving wheel and the driven wheel, to steady the wire rope.

The foregoing is a synopsis of the work which has engaged our attention during the year.

Yours truly,

JAS. McINTOSH,
Foreman.

VI.—CONCLUDING NOTES.

WHY FARMERS DO NOT PATRONIZE AGRICULTURAL COLLEGES.

One of the most pointed communications on this subject recently is from the pen of J. A. W. Oliver, in the "Mark Lane Express:" much truth in bare facts, and very pertinent. With this stimulant I beg to close my 1887 report, by offering a list of reasons, that to me seem to cover the ground in question. Singly or in combination, according to circumstances, they tell why farmers in any country do not send their sons to Agricultural Colleges.

1. Because most of the present farmers have improved their own properties, and consider that their sons should do as well as they have done: reasonable in their light, but rather conservative and unprogressive.

2. Many consider they are as able, and better able, to educate in farming, as any agricultural college can : true, but do they, and what of the science ?

3. That as they have gained their own experience and success by dint of hard labor, hence hard labor is the only true teacher for any farmer : this is the strong philosophy of the plough.

4. Because many have no strong appreciation of the high place of their profession, or respect for its advancement : it is not a profession to such, but a *morning* and *evening* existence.

5. Some are too poor in means, and in labor help to allow a son from home : one of the few legitimate reasons.

6. A few are so politically influenced as to ignore any school not governed by their party.

7. Others have been taught, or at anyrate have the impression, that "science and practice" mean book learning, and that book farming has always been a failure : much truth in one way.

8. Because several farmers' sons who have done well at such colleges have left farming as a profession.

9. They have heard that farmers' sons are classed by themselves and refused admittance to the other college circles : decidedly untrue.

10. They think their sons are influenced for evil by other students at college : true, in all conditions of life, but dependent on individual character.

11. Because college discipline is loose in some respects : also true but not a prominent thing.

12. Because students are not allowed to follow their bent by choosing one or two special agricultural subjects, and are obliged to devote considerable time to English literature, etc. : well worth consideration.

13. Many have been influenced by the non-success of young men known to them, and place more importance upon this than any successful cases they have known.

14. The notoriety that would be attached to sending a son,—a sort of admission to neighbours that they are incapable of showing their own families how to farm.

15. The smart boys having adopted other professions, the dull ones at home are good enough there.

16. Because the faculty is not an efficient one : a rare circumstance as the present generation will not tolerate incapacity.

I consider a large measure of charity is due in arguing any of these circumstances, for it cannot be expected that farmers, as a body, realize the importance of a better education so much as those who have been inststrumental in establishing agricultural colleges ; were they so, it is safe to say that such institutions would be much older in our history and farmers themselves leading in other national problems. Labour and wait should be our motto.

I have the honour to be, sir,
Your obedient servant,

WM. BROWN.

PART V.

REPORT ON

PRACTICAL HORTICULTURE.

ONTARIO AGRICULTURAL COLLEGE,
December 31st, 1887.

To the President of the Ontario Agricultural College:

SIR,—In reviewing very briefly the operation in the practical horticultural department of the Institution for the closing year, I would say that with the exception of a small plantation of forest trees laid out last spring, but very little new work has been undertaken during the year.

This plantation, about three acres in extent, is situated in farm field No. 4, lying in full view from the front of the college building, covering an abrupt gravel knoll, and intended to screen from the eye a somewhat unsightly gravel pit which has been in use for the last few years. The young trees, from three to five feet high, were raised from seeds in the garden or in the experimental grounds, and are composed of a varied assortment, both evergreen and deciduous. The plantation is bounded principally by Norway and native spruces, larch and Austrian pines, enclosing walnut, butternut, English and American ash, birch, elm, linden, Norway and hard maple, etc. The whole is planted in lines eight feet apart, which will admit of the ground being cultivated for several years until the trees are well established. The planting has been a very fair success with the exception of the larches, which, from the naturally dry gravelly soil, and followed by the extreme heat and drought of June and July, many of them failed, and will have to be replaced or substituted the coming season. In 1880, and two following years, several clumps of forest trees were planted in various fields of the farm, the object being twofold—first, for landscape effect, breaking views, etc., and secondly, to test experimentally what growth and progress may be made by the different species and varieties of forest trees under cultivation. Since then, from changes made in special fields, some of those clumps had to be removed for a time, but the original idea has not been lost sight of. Encouraged by the success of those already established, preparation is now being made for extension in this line. About ten thousand seedling trees of varied sorts, viz., Scotch and Austrian pines, larch, elm, mountain ash, sycamores and western catalpas, were procured last spring and planted in our nursing grounds for future use. The following branches of this department, namely, orchard, including small fruits, arboretum and vineyard, has been fully reported on by Prof. Panton, who has taken an active interest in these matters for educational purposes each having been made the subject matter of respective bulletins issued from time to time throughout the season, the whole of which, with additional notes of later observations, I expect will be embodied in his report of this year. I need only say that, notwithstanding a somewhat precarious season on account of the exceptionally hot and dry weather throughout the growing months, causing a shortness in the majority of farm and garden crops, we had nothing in the shape of a failure in either—what proved hurtful to some was favourable

to others. Grapes were unusually good—nearly three tons of fairly matured fruit was cut, up to the first week in October, whereas in ordinary years the earliest varieties only came in about that date. Our experience, of now seven years, tell us plainly that any variety that does not ripen before, or at least equal with Concord, is unprofitable to grow in this section of country. It is true that under certain conditions, such as more shelter, a lighter soil, with a warm, well drained or gravelly sub-soil, some may be successful even in this locality, but from our past record, with a fair trial of about ninety varieties, it seems to me doubtful whether it is wise to continue growing such a large assortment with the bare probability of getting a paying crop once in six or seven years. I feel convinced that a selection of one-fifth of the above variety would include the cream of our present collection, and all that is likely to pay for their cultivation here. The earlier small fruits were very promising and good for a time, but from the continued drouth and persistently dry atmosphere, the bearing season was short.

In vegetables, potatoes, cabbage, cauliflowers and celery were under the usual yield; in everything else a good average crop was secured, and such as can be stored we have in abundance for college uses.

The lawn, flower beds, and borders generally, were satisfactory throughout the summer months, although from the somewhat limited plant growth they had not at any time that fresh luxuriant appearance characteristic of a more favourable year.

I would only further remind you that the greenhouses are still in the unsatisfactory condition reported for several years past, quite unsuited to grow the better class of pot plants, as well as too limited in extent to contain from eight to ten thousand bedding plants now necessary to furnish the grounds.

These defects have been so frequently pointed out that I deem it unnecessary repeat them here. It is only by the aid of hotbeds, frequent handling and much care that we can produce the above number of plants as we have hitherto done.

The following vegetables and fruits were supplied to the College during the year:

January.

Carrots, 3⅔ bush. at 30cts	$1 05	
Turnips, 2½ bush. at 20cts	50	
Onions, 4 bush. at $1.50	6 00	
Parsnips, 3 bush. at 40cts	1 20	
Salsify, 1 bush. at $1.00	1 00	
Celery, 18 doz. at 60cts	10 80	
Cabbages, 2 doz. at 70cts	1 40	
Sundries	30	
		$22 25

February.

Turnips, 4 bush. at 20cts	80	
Parsnips, 4¼ bush. at 40cts	1 70	
Onions, 6¾ bush. at $1.50	10 12½	
Carrots, 5 bush. at 30cts	1 50	
Cabbages, 5 doz. at 70cts	3 50	
Herbs, 3 bun. at 5cts	15	
Sundries	20	
		17 97½

March.

Parsnips, 4 bush. at 45cts	1 80	
Turnips, 3 bush. at 20cts	60	
Carrots, 5 bush. at 30cts	1 50	
Beets, 1½ bush. at 35cts	52½	
Onions, 6 bnsh. at $1.50	9 00	
Cabbages, 9 doz. at 70cts	6 30	
Sundries	65	
		20 37½

April.

Carrots, 6 bush. at 30cts.	$1 80	
Onions, 1½ bush. at $1.50	2 25	
Turnips, 3 bush. at 20cts.	60	
Beets, 1 bush. at 35cts	35	
Parsnips, 4 bush. at 45cts	1 80	
Salsify, ¼ bush. at $1	25	
Cabbages, 11 doz. at 70cts	7 70	
Herbs, 6 bun. at 5cts	30	
Sundries	40	
		$15 45

May.

Turnips, 4 bush. at 20cts.	80	
Lettuce, 8 bush. at 60cts	4 80	
Parsnips, 8½ bush. at 45cts.	3 82½	
Rhubarb, 25¾ bush. at 70cts	18 02½	
Cabbages, 1⅓ doz, at 75cts.	1 00	
Asparagus, 744 bun. at 4cts	29 76	
Onions, 21 bun. at 5cts	1 05	
Sundries	85	
		60 11

June.

Rhubarb, 18 bush. at 60cts	10 80	
Spinach, 25 bush. at 50cts	12 50	
Lettuce, 5¾ bush. at 50cts	2 87½	
Peas, 6½ bush. at $1.00	6 50	
Asparagus, 783 bun. at 4cts	31 32	
Onions, 38 bun. at 5cts	1 90	
Goosberries, 211 qrts. at 6cts	12 66	
Strawberries, 178 boxes, at 7cts.	12 46	
Sundries	20	
		91 21½

July.

Peas, 10¼ bush. at $1.00	10 25	
Rhubarb, 1¼ bush. at 60cts	75	
Lettuce, 2 bush, at 40cts.	80	
Spinach, 2½ bush. at 40cts	1 00	
Beets, 1½ bush. at 80cts	1 20	
Potatoes, 8½ bush. at $1.50	12 75	
Carrots, 2½ bush. at 60cts	1 35	
Beans, 4 bush. at $1.00	4 00	
Apples, 2 bush. at 80cts.	1 60	
Cucumbers, ½ bush. at $1.40	70	
Goosberries, 91 qrts. at 6cts.	5 46	
Strawberries, 34 boxes, at 6cts.	2 04	
Raspberries, 677 boxes, at 7cts	47 39	
Currants, 182 boxes, at 6cts	10 92	
" Black, 45 boxes, at 12cts	5 40	
Onions, 20 bun. at 5cts	1 00	
Herbs, 4 bun. at 5cts	20	
Corn, 1 doz. at 8cts	8	
		106 89

August.

Beans, 4 bush. at $1.00	$4 00	
Cucumbers, 4 bush. at $1.50	6 00	
Potatoes, 18½ bush. at 90cts	16 65	
Carrots, ¾ bush. at 25cts	18½	
Apples, 13½ bush. at 70cts	9 45	
Onions, 1¼ bush. at $1.50	1 87½	
Tomatoes, 11¾ bush. at $1.30	15 27½	
Beets, ½ bush. at 25cts	12½	
Corn, 62 doz. at 8cts	4 96	
Vegetable Marrow, 7½ doz. at 60cts	4 50	
Cabbages, 3 doz. at 60cts	1 80	
Peppers, 1½ doz. at 15cts	22½	
Cauliflower, ½ doz. at 75cts	37½	
Raspberries, 55 boxes, at 7cts	3 85	
Plums, 156 qrts. at 6cts	9 36	
Sundries	20	
		$78 83

September.

Potatoes, 70 bush. at 65cts	45 50	
Apples (Russets), 15 bush. at 70cts.	10 50	
Apples, R. J. Greening, 6 bush. at 70 cts	4 20	
" Snow, 23 bush. at 70cts	16 10	
" Baldwin, 5 bush. at 75 cts	3 75	
" Mixed, 8½ bush. at 50 cts	4 25	
" Crab, 1 bush at $1.00	1 00	
Onions, 1 bush. at $1.50	1 50	
Pears, 1½ bush. at $1.60	2 40	
Parsnips, ¼ bush. at 40 cts	10	
Carrots, 1 bush. at 30 cts	30	
Tomatoes, 9½ bush. at 80 cts	7 60	
" Green, 4 bush. at 50 cts	2 00	
Corn, 7 dozen at 8 cts	56	
Cabbage, 2 dozen at 60 cts	1 20	
Cauliflower, 1½ dozen at 70 cts	1 05	
Peppers, 1 dozen at 15 cts	15	
Citron, 5 dozen at 60 cts	3 00	
Celery, ½ dozen at 60 cts	30	
Vegetable Marrow, 23½ dozen at 60 cents	14 10	
Plums, 96 quarts at 6 cts	5 76	
Grapes, 338 lbs. at 4 cts	13 52	
" 272 lbs. at 2 cts	5 44	
Melons, 21 at 10 cts	2 10	
Sundries	25	
		146 63

October.

Carrots, 2¼ bush. at 25 cts	62½	
Parsnips, 3 bush. at 40 cts	1 20	
Tomatoes, ½ bush. at 75 cts	37½	
Onions, 2½ bush. at $1.50	3 75	
Salsify, 1 bush. at $1.00	1 00	
Beets, 1 bush. at 35 cts	35	
Turnips, ¾ bush. at 15 cts	11	
Cabbage, 8 doz. at 50 cts	4 00	

Celery, 17½ doz. at 60 cts	$10 50	
Cauliflower, 13½ doz. at 60 cts	8 10	
Winter Radish, 5½ doz. at 10 cts	55	
Cabbage (pickling), 9½ doz. at 60 cts	5 70	
Melons, 16 at 10 cts	1 60	
Sundries	80	
		$38 66

November.

Turnips, 3¼ bush. at 15 cts	49	
Parsnips, 3¼ bush. at 40 cts	1 30	
Carrots, 2¼ bush. at 25 cts	56	
Onions, 4¼ bush. at $1.50	6 37½	
Artichokes, 2 bush. at 75 cts	1 50	
Beets, 1 bush. at 35 cts	35	
Celery, 34½ doz. at 60 cts	20 70	
Cabbage, 6 doz. at 50 cts	3 00	
Radish, 8 doz. at 10 cts	80	
Cauliflowers, 5 doz. at 60 cts	3 00	
Vegetable Marrow, 3 doz. at 10 cts	30	
Herbs, 3 buns. at 5 cts	15	
		38 52½

To December the 15th.

Parsnips, 2 bush. at 40 cts	80	
Artichokes, 2 bush. at 75 cts	1 50	
Turnips, 1¾ bush. at 15 cts	26	
Carrots, 1½ bush. at 25 cts	37½	
Onions, 1 bush. at $1.50	1 50	
Salsify, 1 bush. at $1.00	1 00	
Beets, 1 bush. at 35 cts	35	
Celery, 9 doz. at 60 cts	5 40	
Radish, 4 doz. at 10 cts	40	
		11 58½

Total supplied to College	$648 49½
To Prof. Brown at above rates, to August the 1st	48 27
Sold, and cash paid to Bursar	296 69
Total	$993 45½

Inventory—Stock and Implements on hand, as per list in offices.

JAMES FORSYTH.

PART VII.

REPORT OF THE PHYSICIAN.

GUELPH, December 31st, 1887.

To the Honourable A. M. Ross,
Commissioner of Agriculture:

SIR,—At the close of another year I have the honour of presenting my Annual Report.

I am pleased to be able to state that the College is in a good sanitary condition. I have exercised constant watchfulness during the past year, as we have had more than the usual contagious diseases in the city and country.

We have had nothing of an unusual character until the present session. During the past three months we have had a good deal of throat trouble of an inflammatory nature.

We had one case of diphtheria, which received immediate treatment and isolation, and was thereby prevented from spreading. This patient made a good recovery, for which we were thankful, as there have been a good many deaths in the city and country from this disease this year.

I am still anxious to see in connection with this Institution properly isolated apartments for the sick, where, in case of epidemic, we could remove our patients at once.

I have the honour to be, Sir,
Your obedient servant,

E. W. McGUIRE.

ESTIMATES

OF THE

PROVINCE OF ONTARIO

FOR THE

FINANCIAL YEAR ENDING 31st DECEMBER,

1888.

Toronto:
PRINTED BY WARWICK & SONS, 26 & 28 FRONT STREET WEST.
1888.

SUMMARY

Of the Estimated Expenditure of the Province of Ontario for the Financial Year ending 31st December, 1888.

No.	SERVICES.	PAGE.	TO BE VOTED. For Current Expenditure	On Capital Account.	For other purposes.
			$ cts.	$ cts.	$ cts.
I.	Civil Government	5	195,195 00		
II.	Legislation	11	122,050 00		
III.	Administration of Justice	12	364,346 00		
IV.	Education	16	580,962 00		
V.	Public Institutions Maintenance	20	703,624 50		
VI.	Immigration	29	7,700 00		
VII.	Agriculture	30	135,631 00		
VIII.	Hospitals and Charities	32	113,277 24		
IX.	Maintenance and Repairs of Government and Departmental Buildings	"	62,976 43		
X.	Public Buildings	35			
	(1) Repairs		27,796 50		
	(2) Capital Account			253,615 70	
XI.	Public Works	39			
	(1) Repairs		19,600 00		
	(2) Capital Account			30,896 00	
XII.	Colonization Roads	40		101,600 00	
XIII.	Charges on Crown Lands	44	101,900 00		
XIV.	Refund Account	45			27,954 25
XV.	Statute Consolidation	46	21,500 00		
XVI.	Miscellaneous Expenditure	47	68,100 00		
XVII.	Unforeseen and Unprovided	"	50,000 00		
	Total		2,574,658 67	386,111 70	27,954 25

1. Current Expenditure for 1888	2,574,658 67
2. On Capital Account	386,111 70
3. Other purposes	27,954 25
Amount of Estimates	2,988,724 62

ESTIMATES OF EXPENDITURE

OF THE

PROVINCE OF ONTARIO

FOR THE YEAR 1888.

I.—CIVIL GOVERNMENT.

To be voted per Statement (A).....$195,195.00.

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
	The Salaries and Contingencies of the following Departments and Offices.	$ cts.	$ cts.	$ cts.	$ cts.
1	Government House	1,750 00	1,750 00	.....	
2	Lieutenant-Governor's Office	3,980 00	3,980 00	.....	
3	Executive Council and Attorney-General's Department	16,230 00	16,560 00	330 00	
4	Department of Education	21,250 00	21,400 00	150 00	
5	" Crown Lands	49,150 00	49,750 00	600 00	
6	" Public Works	18,630 00	18,600 00	.....	30 00
7	Treasury Department	19,250 00	19,975 00	725 00	
8	Department of Agriculture	500 00	500 00	.....	
9	Secretary and Registrar's Department	32,675 00	34,205 00	1,530 00	
10	Department of Immigration	1,600 00	1,600 00	.....	
11	Public Institutions	9,375 00	9,400 00	25 00	
12	Provincial Board of Health	6,975 00	6,975 00	.....	
13	Miscellaneous	10,400 00	10,500 00	100 00	
		191,765 00	195,195 00	3,460 00	30 00

I.—CIVIL GOVERNMENT.—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
	DETAILS.		
1	GOVERNMENT HOUSE.		
	Expenses.		
	Gardener and Caretaker	500 00	500 00
	Fireman and Assistant Gardener	450 00	450 00
	Assistant Gardeners	800 00	800 00
		1,750 00	1,750 00
2	LIEUTENANT-GOVERNOR'S OFFICE.		
	Salaries.		
	Private Secretary	1,200 00	1,200 00
	Official Secretary	800 00	800 00
	Messenger	480 00	480 00
	Expenses.		
	Contingencies	1,500 00	1,500 00
		3,980 00	3,980 00
3	EXECUTIVE COUNCIL AND ATTORNEY-GENERAL'S DEPARTMENT.		
	Salaries.		
	Attorney-General and Premier	5,000 00	5,000 00
	Clerk of Executive Council and Deputy Attorney-General	3,000 00	3,000 00
	Law Secretary of Department	800 00	800 00
	Clerk and Premier's Secretary	1,400 00	1,500 00
	Assistant Clerk of Executive Council	1,400 00	1,400 00
	Clerk and Shorthand-writer	1,000 00	1,000 00
	Clerk	650 00	700 00
	Clerk	550 00	600 00
	Messenger	250 00	300 00
	Expenses.		
	Housekeeper $500 00		
	Fireman 360 00		
	⅓ of $860 00	430 00	430 00
	Contingencies, including new typewriter	1,750 00	1,830 00
		16,230 00	16,560 00
4	EDUCATION DEPARTMENT.		
	Salaries.		
	Minister of Education	4,000 00	4,000 00
	Deputy Minister	3,000 00	3,000 00
	Secretary	2,000 00	2,000 00
	Chief Clerk and Accountant	1,400 00	1,400 00
	Clerk	1,250 00	1,250 00
	"	1,200 00	1,200 00
	"	1,200 00	1,200 00
	"	950 00	1,000 00

I.—CIVIL GOVERNMENT—*Continued.*

No of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
	EDUCATION DEPARTMENT—*Continued.*		
	Salaries.		
	Clerk	950 00	1,000 00
	"	750 00	750 00
	Junior Clerk	650 00	650 00
	"	500 00	550 00
	"	500 00	500 00
	Clerk and Messenger	550 00	550 00
	Caretaker, including all allowances for cleaning offices, museum etc	500 00	500 00
		19,400 00	19,550 00
	Expenses.		
	Postage	550 00	550 00
	Printing, paper for circulars and blanks	500 00	500 00
	Office stationery and account books	300 00	300 00
	Books on education, periodicals, papers, law and other reports, and advertising	150 00	150 00
	Contingencies	150 00	150 00
	Travelling and other expenses	200 00	200 00
		21,250 00	21,400 00
5	CROWN LANDS DEPARTMENT.		
	Salaries.		
	Commissioner	4,000 00	4,000 00
	Assistant Commissioner	2,600 00	2,600 00
	Law Clerk	2,000 00	2,000 00
	Shorthand writer and Clerk	1,200 00	1,200 00
	Land Sales and Free Grants:—		
	Chief Clerk	1,900 00	1,900 00
	Clerk	1,300 00	1,300 00
	"	1,250 00	1,250 00
	"	1,000 00	.....
	"	850 00	850 00
	"	700 00	750 00
	Surveys, Patents and Roads:—		
	Chief Clerk, Surveys	1,900 00	1,900 00
	" Draughtsman	1,150 00	1,150 00
	" Patents	1,400 00	1,200 00
	Clerk	1,200 00	1,100 00
	"	850 00	900 00
	Superintendent, Colonization Roads	1,800 00	1,900 00
	Clerk	1,150 00	1,150 00
	"	.....	800 00
	Woods and Forests:—		
	Chief Clerk	2,000 00	2,000 00
	Clerk	1,800 00	1,800 00
	"	1,200 00	1,250 00
	"	1,100 00	1,100 00
	"	900 00	900 00
	"	.....	800 00
	Accounts:—		
	Accountant and Book-Keeper	1,700 00	1,700 00
	Clerk	1,300 00	1,300 00
	"	850 00	850 00
	"	850 00	900 00
	Registrar	1,600 00	1,600 00

I.—CIVIL GOVERNMENT—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
	CROWN LANDS DEPARTMENT—*Continued.*		
	Expenses.		
	Housekeeper	500 00	500 00
	Fireman	550 00	550 00
	Clerk and Messenger	550 00	550 00
	Night Watchman	500 00	500 00
	Contingencies	7,500 00	7,500 00
		49,150 00	49,750 00
6	PUBLIC WORKS DEPARTMENT.		
	Salaries.		
	Commissioner	4,000 00	4,000 00
	Architect	2,400 00	2,400 00
	Engineer	1,800 00	1,800 00
	Secretary, Public Works	1,900 00	1,900 00
	Accountant and Law Clerk	1,050 00	1,100 00
	Architectural Draughtsman	1,100 00	1,100 00
	Engineering "	950 00	1,000 00
	Assistant Architectural Draughtsman	750 00	850 00
	First Clerk and Shorthand Writer	1,000 00	1,000 00
	Clerk and Paymaster of outlying works	900 00	900 00
	Messenger	550 00	550 00
	Expenses.		
	Caretaking, etc., Departmental Building	430 00	200 00
	Contingencies	1,800 00	1,800 00
		18,630 00	18,600 00
7	TREASURY DEPARTMENT.		
	Salaries.		
	Treasurer	4,000 00	4,000 00
	Assistant Treasurer	2,000 00	2,000 00
	Chief Clerk	1,200 00	1,200 00
	Clerk	800 00	850 00
	"	550 00	600 00
	Messenger Boy	250 00	275 00
	Clerk of Contingencies and Shorthand Writer	1,200 00	1,200 00
	Clerk and Cashier	1,200 00	1,000 00
	Audit Branch.		
	Auditor	2,400 00	2,400 00
	Book-keeper	1,200 00	1,200 00
	Clerk	700 00	750 00
	"	.....	750 00
	Contingencies	800 00	800 00
	Expenses.		
	House-keeper (half charged under Provincial Secretary's Department)	200 00	200 00
	Fireman (half charged under Provincial Secretary's Department)	250 00	250 00
	Contingencies, printing, stationery, postage, telegraph, etc.	2,500 00	2,500 00
		19,250 00	19,975 00
8	DEPARTMENT OF AGRICULTURE.		
	Printing, postage, stationery and travelling expenses	500 00	500 00
		500 00	500 00

I.—CIVIL GOVERNMENT—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
9	SECRETARY AND REGISTRAR'S DEPARTMENT.		
	Salaries.		
	Secretary and Registrar	4,000 00	4,000 00
	Assistant Secretary	2,000 00	2,000 00
	Clerk	1,100 00	1,100 00
	"	1,000 00	1,000 00
	"	950 00	950 00
	Deputy Registrar	1,300 00	1,400 00
	Clerk	900 00	900 00
	" (transferred from Immigration Department)	.....	850 00
	Shorthand-writer	1,200 00	1,200 00
	Engrossing Clerk	550 00	600 00
	Messenger	400 00	450 00
	Expenses.		
	Housekeeper (half charged to Treasury Department)	200 00	200 00
	Fireman " "	250 00	250 00
	Printing and binding $600 00		
	Stationery 600 00		
	Postage and telegraph 750 00		
	Contingencies 450 00		
	Expenses 200 00		
	To pay for assistance re arrears of work 1,400 00		
		4,000 00	2,400 00
	Registrar-General's Branch.	17,850 00	17,300 00
	Salaries.		
	First Clerk	1,300 00	1,400 00
	Second "	1,000 00	1,000 00
	Clerk	900 00	900 00
	"	900 00	900 00
	"	850 00	850 00
	"	750 00	750 00
	Expenses.		
	For supply of blank forms to Postmaster	300 00	300 00
	Indices	200 00	200 00
	Schedules, slips and circulars	1,400 00	1,400 00
	Stationery and printing	400 00	400 00
	Postage	250 00	250 00
	Express charges	25 00	25 00
	Travelling expenses inspecting District Registrars	500 00	500 00
	Binding returns, two years	150 00	150 00
	Contingencies	150 00	150 00
	Housekeeper 500 00		
	Fireman 360 00		
	½ of 860 00	.....	430 00
		9,075 00	9,605 00
	License and Administration of Justice Accounts Branch.		
	Salaries.		
	First officer	1,700 00	1,800 00
	Accountant, License Branch	1,300 00	1,400 00
	Accountant and Provincial Inspector	.....	1,300 00
	Clerk	1,250 00	1,250 00
	"	850 00	900 00

I.—CIVIL GOVERNMENT—*Continued.*

No. of Vote.	SERVICE.		Salaries and Expenses. 1887.	**1888.**
			$ cts.	$ cts.
	SECRETARY AND REGISTRAR'S DEPARTMENT—*Continued.*			
	Expenses.			
	Stationery	$300 00		
	Postage and telegraph	300 00		
	Sundries	50 00	650 00	650 00
			5,750 00	7,300 00
10	IMMIGRATION DEPARTMENT.			
	Secretary and Intelligence Officer		1,300 00	1,300 00
	Contingencies		300 00	300 00
			1,600 00	1,600 00
	PUBLIC INSTITUTIONS.			
11	*Salaries.*			
	Two Inspectors		4,000 00	4,000 00
	Chief Clerk		1,400 00	1,400 00
	Clerk		1,000 00	1,000 00
	Shorthand Writer		950 00	950 00
	Messenger, youth		275 00	300 00
	Expenses.			
	Travelling		900 00	900 00
	Postage	$250 00		
	Printing	350 00		
	Stationery	100 00		
	Contingencies	150 00	850 00	850 00
			9,375 00	9,400 00
12	PROVINCIAL BOARD OF HEALTH.			
	Chairman		400 00	400 00
	Secretary		1,750 00	1,750 00
	First Clerk		900 00	900 00
	Second "		800 00	800 00
	Printing, binding, stationery, etc		1,300 00	1,300 00
	Per diem allowance to members of Board when attending meetings of Council and Committees		800 00	800 00
	Travelling expenses of members of Board and Secretary		600 00	600 00
	Half wages of Messenger and Fireman (half to Bureau of Statistics)		425 00	425 00
			6,975 00	6,975 00
13	MISCELLANEOUS.			
	Cost of Official Gazette		3,000 00	3,000 00
	Queen Printer's Salary		1,300 00	1,300 00
	Assistant Queen's Printer		1,000 00	1,000 00
	Contingencies, including stationery, postage, etc		100 00	100 00
	Inspector of Registry Offices		1,500 00	1,500 00
	Travelling expenses		400 00	400 00
	Inspector of Insurance } Repaid by Insurance		2,000 00	2,000 00
	Clerk } Companies, under Act		700 00	700 00
	Contingencies (travelling and office expenses) } of 1879		400 00	500 00
			10,400 00	10,500 00

II.—LEGISLATION.

To be voted per Statement (A) .....$122,050.00.

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887. Increase.	Compared with Estimates of 1887. Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
14	Legislation	123,600 00	122,050 00	....	1,550 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	Salaries and Expenses. 1888.
14	DETAILS.	$ cts.	$ cts.
	Salaries.		
	Mr. Speaker's salary	1,250 00	1,250 00
	Clerk of the House, salary	1,800 00	1,800 00
	Clerk Assistant and Clerk of Routine	1,400 00	1,400 00
	Law Clerk	1,000 00	1,000 00
	Clerk and Postmaster	1,000 00	1,000 00
	Librarian	1,600 00	1,600 00
	Assistant Librarian	700 00	700 00
	Accountant of the House and Stationery Clerk (also Queen's Printer)	400 00	400 00
	Sergeant-at-Arms	600 00	600 00
	Housekeeper and Chief Messenger	600 00	600 00
	Three Messengers	1,350 00	1,350 00
	Fireman	450 00	450 00
	Night Watchman	500 00	500 00
	Sessional Clerks, Writers, Messengers and Pages	13,000 00	13,000 00
	Expenses.		
	Postages and cost of House Post Office	3,000 00	3,000 00
	Stationery, including printing paper, printing and binding	22,000 00	22,000 00
	Printing Bills and distributing Statutes	3,500 00	3,500 00
	Library, for books and binding, etc	4,250 00	3,000 00
	Binding old Canadian Parliamentary Journals (*Revote*)	600 00	400 00
	Printing and Binding Catalogue (*Revote in part*)	1,300 00	1,500 00
	Indemnity to Members, including mileage	60,300 00	60,000 00
	Subscription to newspapers and periodicals	1,000 00	1,000 00
	Contingencies	2,000 00	2,000 00
		123,600 00	122,050 00

III.—ADMINISTRATION OF JUSTICE.

To be voted per Statement (A) .....$364,346.00.

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887. Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
15	Supreme Court of Judicature	56,933 00	54,853 00	.....	2,080 00
16	Surrogate Judges and Local Masters	20,143 00	21,043 00	900 00	.....
17	Miscellaneous Criminal and Civil Justice	295,889 75	288,450 00	.....	7,439 75
		372,965 75	364,346 00	900 00	9,519 75

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
	Details.	$ cts.	$ cts.
15	Supreme Court of Judicature.		
	Allowance to Judges as Heir and Devisee Commissioners	9,000 00	7,000 00
	Registrar of Supreme Court and Court of Appeal	2,000 00	2,000 00
	Contingencies, printing, etc	200 00	200 00
	Extra Clerk, Osgoode Hall	600 00	.....
	Master in Chambers	3,600 00	3,800 00
	Clerk	1,200 00	1,200 00
	Entering Clerk	600 00	650 00
	Contingencies	350 00	350 00
	Master in Ordinary	3,600 00	3,600 00
	Chief Clerk	1,400 00	1,400 00
	Shorthand Writer	800 00	800 00
	(This is besides certain fees, and an allowance as reporter to Judges on Circuit,)		
	Contingencies	250 00	200 00
	Two Taxing Officers	3,400 00	3,400 00
	Salaries in Accountant's Office, as regulated by the Court and borne by General Interest Account out of surplus interest (Suitor's Fund) are same as set forth in estimates of last year.		
	Court of Appeal.		
	Usher and Messenger	600 00	600 00
	Assistance in office, copying orders, etc., in lieu of Clerk	600 00	700 00
	Judge's Library	100 00	100 00
	Judges' Library (revote from 1886)	100 00	.....
	Contingencies	400 00	520 00

III.—ADMINISTRATION OF JUSTICE— *Continued.*

No. of Vote.	SERVICE	Salaries and Expenses. 1887.	1888.
	HIGH COURT.	$ cts.	$ cts.
	Clerk of the Process and the Heir and Devisee Commission	1,800 00	1,800 00
	Clerk in his office	900 00	950 00
	Contingencies	60 00	60 00
	Clerk of Assize	1,000 00	1,000 00
	Contingencies	50 00	50 00
15	CHANCERY DIVISION.		
	Registrar and Judgment Clerk	2,100 00	2,100 00
	(*The Registrar has also $400 from the Suitors' Fund.*)		
	Assistant Registrar and Judgment Clerk	1,600 00	1,600 00
	Entering Clerk	650 00	700 00
	Clerk of Records and Writs	1,400 00	1,450 00
	Clerk in Records Office (former clerk had $750)	600 00	700 00
	Second Clerk	500 00	500 00
	Usher	600 00	600 00
	Messenger and Housekeeper	400 00	400 00
	Assistant	250 00	250 00
	Judges' Library	200 00	200 00
	Surrogate Clerk	2,000 00	2,000 00
	Clerk in Surrogate Office	600 00	600 00
	Contingencies	20 00	20 00
	Contingencies for office of Registrar and Clerk of Records and Writs	750 00	750 00
	QUEEN'S BENCH DIVISION.		
	Registrar (*The Registrar has also $500 from Suitors' Fund.*)	2,000 00	2,000 00
	Clerk	1,400 00	1,400 00
	"	850 00	900 00
	"	650 00	650 00
	Housekeeper and Messenger	600 00	600 00
	Two Assistants for addition to Building	588 00	588 00
	Usher and Crier	160 00	160 00
	Message Boy	180 00	180 00
	Judges' Library	100 00	100 00
	Judges' Library (*revote from 1886*)	100 00	.....
	Contingencies	450 00	450 00
	COMMON PLEAS DIVISION.		
	Registrar of the Crown and Pleas	2,500 00	2,500 00
	Clerk (salary of former clerk was $1,200)	1,000 00	1,100 00
	Second Clerk	800 00	800 00
	Usher and Messenger	575 00	575 00
	Judges' Library	100 00	100 00
	Judges' Library (*revote from 1886*)	100 00	.....
	Contingencies	500 00	500 00
		56,933 00	54,853 00
16	SURROGATE JUDGES AND LOCAL MASTERS.		
	Allowances payable to Judges of Surrogate upon commutation of fees	10,409 00	11,309 00
	Junior Judge of County of York, allowance out of Receipts from Surrogate fees	666 00	666 00
	Allowance to Local Masters on commutation of their fees	9,068 00	9,068 00
		20,143 00	21,043 00

III.—ADMINISTRATION OF JUSTICE—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
17	MISCELLANEOUS CRIMINAL AND CIVIL JUSTICE.		
	Crown Counsel prosecutions	12,000 00	10,000 00
	Administration of Criminal Justice	150,000 00	145,000 00
	Inspector of Offices under Judicature Act	2,250 00	2,500 00
	Clerk and Shorthand Writer	.....	800 00
	Travelling and other expenses	600 00	600 00
	Inspector of Division Courts	1,600 00	1,700 00
	Clerk	900 00	950 00
	do	.....	850 00
	Travelling expenses and contingencies	1,050 00	1,050 00
	Salaries, Provincial Detectives	2,700 00	2,800 00
	Special services	1,500 00	2,000 00
		172,600 00	168,250 00
	To pay Sheriffs, Criers, and Constables in attending Courts of Chancery and County Courts, Deputy Clerks of the Crown and Pleas attending Assizes, and their postages, etc.	6,000 00	6,000 00
	Seals and other contingencies	300 00	300 00
	Registration Books for Muskoka, Parry Sound and Thunder Bay	600 00	300 00
	For employment of Shorthand Reporters of evidence on trials at the Assizes and Election Courts	10,700 00	10,700 00
	Litigation of Constitutional questions	12,000 00	12,000 00
	Allowances to Sheriffs, under 45 Vict., Chap. 11	3,800 00	3,800 00
	Expenses of County Judges in grouped Counties	1,600 00	2,700 00
	Judges travelling expenses *re* Ditches and Water Courses Act	500 00	500 00
		35,500 00	36,300 00
	Deputy Clerks of the Crown	17,200 00	17,200 00
	" " " as Local Registrars	6,289 00	5,500 00
		23,489 00	22,700 00
	LAND TITLES ACT.		
	Master of Titles for York and Ontario	3,600 00	3,600 00
	Two Clerks (one only provided for last year)	600 00	1,400 00
	Stationery and contingencies	400 00	300 00
	(The fees last year amounted to $4,397. The expenses beyond fees are to be recouped by County and City out of surplus registry fees).	4,600 00	5,300 00
	LOCAL MASTERS OF TITLES IN OUTLYING DISTRICTS.		
	Salaries of Local Masters for Muskoka, Parry Sound, Algoma, Thunder Bay and Nipissing	.....	1,000 00
	Registry and Index Books	.....	1,000 00
	Forms and other contingencies	.....	400 00
	Travelling expenses inspecting	.....	100 00
		.....	2,500 00
	District of Algoma.		
	Sheriff's salary	1,400 00	1,400 00
	Registrar's salary	800 00	800 00
	Magistrate on line of C. P. R.	1,400 00	1,400 00
	Clerk of the Peace and District Attorney	800 00	800 00
	Clerk of the District Court	600 00	600 00
	Magistrate at Sault (temporary)	1,600 00	1,600 00
	Administration of Justice, etc	7,000 00	7,000 00
	Safe for Clerk of the Peace	150 75	.....
		13,750 75	13,600 00

III.—ADMINISTRATION OF JUSTICE—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
	District of Thunder Bay.		
	Sheriff's salary	1,000 00	1,000 00
	House, fuel and light	250 00	250 00
	Chief Constable	400 00	400 00
	Police Magistrate	800 00	800 00
	Administration of Justice, etc	12,000 00	6,000 00
		14,450 00	8,450 00
	District of Rainy River.		
	Stipendiary Magistrate, salary	1,600 00	1,600 00
	Sheriff	800 00	800 00
	Registrar and Clerk of District Court	650 00	650 00
	Administration of Justice, etc	7,500 00	7,500 00
		10,550 00	10,550 00
	District of Nipissing.		
	Stipendiary Magistrate, for Southern Nipissing, salary	1,600 00	1,600 00
	" " Northern Nipissing, salary	1,200 00	1,200 00
	Administration of Justice, etc., in Southern portion	900 00	800 00
	" " in Northern portion, including travelling expenses	2,800 00	2,500 00
		6,500 00	6,100 00
	District of Parry Sound.		
	Stipendiary Magistrate	1,800 00	1,800 00
	Administration of Justice, etc	1,100 00	1,000 00
		2,900 00	2,800 00
	District of Muskoka.		
	Stipendiary Magistrate, salary	1,800 00	1,800 00
	Administration of Justice, etc	1,600 00	1,600 00
		3,400 00	3,400 00
	Provisional County of Haliburton.		
	Administration of Justice	500 00	300 00
		500 00	300 00
	Provincial Police on Niagara and Detroit Rivers.		
	Salary of Police Magistrate on Niagara River	1,200 00	1,200 00
	Administration of Justice	6,450 00	7,000 00
		7,650 00	8,200 00

IV.—EDUCATION.

To be voted per Statement (A) ..... $580,962..00.

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
18	Public and Separate Schools	240,000 00	240,000 00		
19	Schools in new and poor Townships	22,000 00	25,000 00	3,000 00	
20	Model Schools	8,400 00	8,700 00	300 00	
21	Teachers' Institutes	2,000 00	2,000 00		
22	High Schools and Collegiate Institutes	90,600 00	92,100 00	1,500 00	
23	Training Institutes	2,100 00	2,100 00		
24	Inspection of Normal, High, Model, and Public and Separate Schools	50,550 00	50,933 00	383 00	
25	Departmental Examinations	11,000 00	11,200 00	200 00	
26	Normal and Model Schools, Toronto	19,080 00	19,750 00	670 00	
27	Normal Schools, Ottawa	21,010 00	20,035 00		975 00
28	Museum and Library, etc	3,850 00	4,250 00	400 00	
29	School of Practical Science	7,594 00	7,594 00		
30	Mechanics' Institutes, Art Schools, Literary and Scientific	36,500 00	36,500 00		
31	Miscellaneous	2,274 65	2,500 00	225 35	
32	Superannuated Teachers	58,300 00	58,300 00		
		575,258 65	580,962 00	6,678 35	975 00

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
	Details.	$ cts.	$ cts.
18	Public and Separate Schools	240,000 00	240,000 00
19	Schools in new and poor Townships and Unorganized Territory	22,000 00	25,000 00
20	57 Model Schools (56 in 1887)	8,400 00	8,700 00
21	66 Teachers' Institutes, including Provincial	2,000 00	2,000 00
22	111 High Schools and Collegiate Institutes, including special to Port Arthur, $500, (109 in 1887)	90,600 00	92,100 00
23	5 Training Institutes (4 in 1887)	2,000 00	2,000 00
	Expenses, Printing, etc	100 00	100 00
		2,100 00	2,100 00

IV.—EDUCATION—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
24	INSPECTION OF NORMAL, HIGH, MODEL, PUBLIC AND SEPARATE SCHOOLS.		
	5,800 Public Schools at $5, (including Model Schools)	29,000 00	29,000 00
	Inspector of Normal Schools and Director of Teachers' Institutes	2,600 00	2,600 00
	Two Inspectors of High Schools	4,600 00	4,600 00
	Inspector of County Model Schools	1,750 00	1,750 00
	Two Inspectors of Separate Schools	3,400 00	3,400 00
	Two Inspectors of Schools in Algoma and Parry Sound	3,000 00	3,000 00
	Travelling expenses (Eight Inspectors)	3,200 00	3,200 00
	Proportion of payments to Inspectors in the Districts, viz.: (1) Nipissing, (2) Haliburton, and (3) the Northern parts of the Counties of Victoria, Peterborough, Hastings, Addington and Renfrew	1,100 00	1,100 00
	Stationery, postage, printing paper, and incidentals	1,900 00	1,900 00
	Arrears, travelling expenses (1887)	.....	383 00
		50,550 00	50,933 00
25	DEPARTMENTAL EXAMINATIONS.		
	Central Committee of Examiners	1,100 00	1,100 00
	Sub Examiners for reading the answers of Candidates for 2nd and 3rd Class Certificates, the estimated number being 5,000 (to be re-imbursed from fees)	6,800 00	7,000 00
	Clerk	700 00	700 00
	Postage, stationery and incidentals	500 00	500 00
	Confidential printing of examination papers :—		
	(1) New Type	100 00	100 00
	(2) Ink, fire, light, water and incidentals	100 00	100 00
	(3) Paper for printing; envelopes, etc	800 00	800 00
	(4) Salary of Printer and Assistant	900 00	900 00
		11,000 00	11,200 00
26	NORMAL AND MODEL SCHOOLS, TORONTO.		
	Salaries.		
	The Principal	2,250 00	2,250 00
	Second Master	1,800 00	1,800 00
	Drawing Master	1,000 00	1,000 00
	French Master	150 00	150 00
	Music Master	800 00	800 00
	Drill and Gymnastic Master	300 00	300 00
	Head Master of Boys' Model School	1,200 00	1,200 00
	First Assistant "	1,000 00	1,000 00
	Second " "	850 00	850 00
	Third " "	650 00	650 00
	Head Mistress of Girls' Model School	1,000 00	1,000 00
	First Assistant "	800 00	800 00
	Second " "	700 00	700 00
	Third " "	650 00	650 00
	Teacher of Kindergarten	800 00	800 00
	Assistant Teacher of Kindergarten	.....	480 00
	Head Gardener, including $190 in lieu of house	410 00	600 00
	Assistant Gardener	400 00	400 00
	First Engineer, with house and fuel	410 00	410 00
	Second "	400 00	400 00
	Third "	400 00	400 00
	Janitor of Normal School, including cleaning	510 00	510 00
	" Boys' Model School "	400 00	400 00
	" Girls' " "	400 00	400 00
		17,280 00	17,950 00

IV.—EDUCATION—*Continued.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
		$ cts.	$ cts.
26	NORMAL AND MODEL SCHOOLS, TORONTO—*Continued.*		
	Expenses.		
	Text and reference book for masters, and reading-room for students	200 00	200 00
	Stationery, chemicals and contingencies	1,000 00	1,000 00
	Text Books for Model School pupils	600 00	600 00
		19,080 00	19,750 00
27	NORMAL AND MODEL SCHOOLS, OTTAWA.		
	Salaries.		
	The Principal	2,250 00	2,250 00
	Mathematical Master	*1,600 00*	
	Second Master	1,800 00	1,800 00
	Drawing Master	800 00	800 00
	French Master	150 00	150 00
	Music Master	800 00	800 00
	Clerk and Accountant	600 00	600 00
	Drill and Gymnastic Master	300 00	300 00
	Head Master of Boys' Model School	1,200 00	1,200 00
	First Assistant "	1,000 00	1,000 00
	" " " *arrears (1886)*	*100 00*	
	Second " "	850 00	850 00
	Third " "	650 00	650 00
	Head Mistress of Girls' Model School	1,000 00	1,000 00
	First Assistant "	800 00	800 00
	Second " "	700 00	700 00
	Third " "	650 00	650 00
	First Engineer and Gardener	600 00	600 00
	Second " "	450 00	450 00
	Labourer on grounds	400 00	400 00
	Janitor, Normal School, salary with allowance for cleaning	510 00	510 00
	" Boys' Model School, salary	400 00	400 00
	" Girls' " "	400 00	400 00
	Teacher of Kindergarten	800 00	800 00
	Assistant Teacher of Kindergarten		480 00
	Night Watchman	400 00	400 00
	Expenses.		
	Text and reference books for masters, and reading-room for students	200 00	200 00
	Stationery, chemicals and supplies	1,000 00	1,000 00
	Text Books for Model School pupils	600 00	600 00
	Unpaid accounts (1887)		245 00
		21,010 00	20,035 00
28	MUSEUM AND LIBRARY.		
	Salaries and Expenses.		
	Superintendent Mechanics' Institute. (The $300 additional is to cover amount heretofore paid for special services.)	1,400 00	1,700 00
	Clerk and Messenger	500 00	600 00
	Librarian	500 00	500 00
	Junior Clerk	400 00	400 00
	Postage and stationery	100 00	100 00
	Incidentals and purchases	250 00	250 00
	Binding books and periodicals	200 00	200 00
	Educational and technical books for reference	500 00	500 00
		3,850 00	4,250 00

IV.—EDUCATION—*Concluded.*

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
29	SCHOOL OF PRACTICAL SCIENCE.	$ cts.	$ cts.
	Salaries and Expenses.		
	Professor in Engineering	2,000 00	2,000 00
	Professor of Applied Chemistry	1,500 00	1,500 00
	Fellow in Engineering Department	500 00	500 00
	Fellow in Chemistry	500 00	500 00
	Secretary	100 00	100 00
	Attendant on Department of Biology	144 00	144 00
	Chemicals and other materials	1,100 00	1,100 00
	Printing, advertising, postage, stationery, binding and incidentals	450 00	450 00
	Workshop appliances	500 00	500 00
	Telephone	50 00	50 00
	Caretaker, including allowance for house	750 00	750 00
		7,594 00	7,594 00
30	MECHANICS' INSTITUTES, ART SCHOOLS, LITERARY AND SCIENTIFIC.		
	Mechanics' Institutes	30,000 00	30,000 00
	Art Examinations	1,200 00	1,200 00
	Ontario Society of Artists	500 00	500 00
	Seven Art Schools (7 in 1887)	2,800 00	2,800 00
	Aid to Canadian Institute, Toronto	1,000 00	1,000 00
	" Institut Canadien, Ottawa	300 00	300 00
	" Ottawa Literary and Scientific Society	300 00	300 00
	" Hamilton Literary Institute	400 00	400 00
		36,500 00	36,500 00
31	MISCELLANEOUS.		
	For cost of Minister's Report	500 00	500 00
	School Registers	600 00	1,000 00
	School Act to be sold to Trustees, etc.	1,000 00	1,000 00
	Balance re Publication Account	174 65	.....
		2,274 65	2,500 00
32	SUPERANNUATED PUBLIC AND HIGH SCHOOL TEACHERS.		
	Annual retiring allowance to Teachers and Inspectors	58,000 00	58,000 00
	Medical examination fees, printing paper and incidentals	300 00	300 00
		58,300 00	58,300 00

V.—PUBLIC INSTITUTIONS MAINTENANCE.

To be voted per Statement (A).....$703,624.50.

No. of Vote.	A.	Voted for 1887.	To be voted for 1888.	Compared with estimates of 1887. Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
33	Asylum for Insane, Toronto	97,874 15	103,753 00	5,878 85	.....
34	" " London	124,320 00	122,542 00	.....	1,778 00
35	" " Kingston	89,240 00	86,911 00	.....	2,329 00
36	" " Hamilton	84,042 00	102,820 00	18,778 00	.....
37	" Idiots, Orillia	29,400 00	47,761 00	18,361 00	.....
38	Central Prison, Toronto	90,576 56	90,925 00	348 44	.....
39	Ontario Reformatory for Boys, Penetanguishene	41,910 00	43,360 00	1,450 00	.....
40	Institution for the Deaf and Dumb, Belleville	40,050 50	40,350 50	300 00	.....
41	" " Blind, Brantford	33,817 00	34,226 00	409 00	.....
42	Andrew Mercer Reformatory for Women and Refuge for Girls, Toronto	29,876 00	30,976 00	1,100 00	.....
		661,106 21	703,624 50	46,625 29	4,107 00

No. of Vote.	SERVICES.		Salaries and Expenses. 1887.	1888.
33	DETAILS.		$ cts.	$ cts.
	ASYLUM FOR INSANE, TORONTO.			
	(For 710 patients; 710 in 1887.)			
	Salaries.	No. of Officers and Employes.		
	Medical Superintendent	1	2,000 00	2,000 00
	Assistant "	1	1,000 00	1,100 00
	Second Assistant "	1	750 00	800 00
	Bursar	1	1,400 00	1,400 00
	Bursar's Clerk	1	800 00	800 00
	Steward	1	750 00	750 00
	Storekeeper	1	800 00	800 00
	Assistant Storekeeper	1	700 00	700 00
	Engineer	1	740 00	740 00
	Stokers	3	792 00	792 00
	Engine-driver for laundry	1	300 00	300 00
	Bricklayer and Mason	1	625 00	625 00
	Carpenters	2	1,125 00	1,150 00
	Gardener	1	400 00	400 00
	Assistant Gardener	1	300 00	300 00
	Porter	1	264 00	264 00
	Baker	1	400 00	400 00
	Assistant Baker	1	216 00	216 00
	Tailor	1	625 00	625 00
	Farmer and Assistant	2	652 00	652 00
	Teamster	1	240 00	240 00
	Night Watchers	3	756 00	756 00
	Chief Attendants	7	2,052 00	2,052 00
	Ordinary Male Attendants	17	3,912 00	3,912 00
	Painter and Jobber	1	550 00	575 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Salaries and Expenses. 1887.	1888.
33	ASYLUM FOR THE INSANE, TORONTO—*Continued.*		$ cts.	$ cts.
	FEMALES.			
	Matron	1	450 00	450 00
	Assistant Matron	1	250 00	250 00
	Chief Attendants	6	816 00	996 00
	Ordinary "	20	2,400 00	3,000 00
	Night "	3	396 00	450 00
	Cooks	5	684 00	684 00
	Laundresses	5	540 00	576 00
	Housemaids	4	396 00	396 00
	Seamstress	1	132 00	132 00
	Dairymaid	1	120 00	120 00
		100	28,333 00	29,403 00
	Expenses.			
	Medicine and medical comforts		550 00	550 00
	Fuel		11,441 15	11,400 00
	Butchers' meat, fish and fowl		16,000 00	15,000 00
	Flour, meal, etc		6,500 00	6,500 00
	Butter		4,400 00	4,000 00
	Gas and oil		2,500 00	2,500 00
	Water supply		4,000 00	5,600 00
	Groceries		9,000 00	9,000 00
	Fruit and vegetables		2,500 00	3,500 00
	Bedding, clothing and shoes		4,000 00	5,000 00
	Furniture and furnishings		1,500 00	1,500 00
	Laundry, soap and cleaning		1,200 00	1,200 00
	Farm, feed and fodder		2,700 00	5,000 00
	Miscellaneous		900 00	900 00
	Repairs and alterations		1,500 00	2.000 00
	Printing, postage and stationery		850 00	700 00
34	ASYLUM FOR THE INSANE, LONDON.		97,874 15	103.753 00
	(For 910 patients; 910 in 1887.)			
	Salaries.	No. of Officers and Employés.		
	Medical Superintendent	1	2,000 00	2,000 00
	First Assistant Physician	1	1,000 00	1,100 00
	Second "	1	1,000 00	1.000 00
	Third "	1	900 00	700 00
	Bursar	1	1,400 00	1.400 00
	Bursar's Clerk	1	800 00	800 00
	Storekeeper	1	800 00	800 00
	Assistant Storekeeper	1	550 00	600 00
	Engineer	1	740 00	740 00
	Assistant Engineer	1	400 00	400 00
	Stokers	5	1,296 00	1,296 00
	Bricklayer and Plasterer	1	550 00	600 00
	Carpenters	2	1,050 00	1,050 00
	Tailor	1	460 00	460 00
	Gardener	1	400 00	450 00
	Assistant Gardener	1	240 00	240 00
	Butcher	1	240 00	240 00
	Yardman	1	216 00	216 00
	Porter and Messenger	1	216 00	216 00
	Baker	1	400 00	400 00
	Assistant Baker	1	216 00	216 00
	Farmer	1	600 00	600 00
	Ploughmen	2	552 00	432 00
	Chief Attendants	3	936 00	936 00
	Supervisors	6	1,584 00	1,584 00
	Ordinary Male Attendants	28	6,480 00	6,720 00
	Cowman	1	216 00	216 00
	Laundryman	1	240 00	240 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Salaries and Expenses. 1887.	1888.
			$ cts.	$ cts.
34	ASYLUM FOR THE INSANE, LONDON—*Continued.*			
	FEMALES.			
	Matron	1	500 00	500 00
	Assistant Matron (refractory ward)	1	300 00	300 00
	Chief Attendant	1		
	Supervisors	6		
	Ordinary Female Attendants	24	5,494 00	5,596 00
	Night Attendants	6		
	Cooks and Assistant Cooks	5	672 00	672 00
	Laundresses	4	480 00	480 00
	Housemaids	9	1,032 00	1,032 00
	Dairymaid	1	120 00	120 00
	Seamstress	1	120 00	120 00
	Portress	1	120 00	120 00
		128	34,320 00	34,592 00
	Expenses.			
	Medicine and medical comforts		650 00	650 00
	Fuel		19,450 00	20,000 00
	Butchers' meat, fish and fowl		16,000 00	15,000 00
	Flour		7,000 00	6,500 00
	Butter		5,500 00	6,000 00
	Gas and oil		2,600 00	2,500 00
	Groceries		10,000 00	10,000 00
	Fruit and vegetables		1,000 00	1,000 00
	Bedding, clothing and shoes		13,500 00	13,000 00
	Furniture and furnishings		3,000 00	2,500 00
	Laundry, soap and cleaning		1,000 00	1,000 00
	Farm, feed and fodder		3,000 00	3,000 00
	Miscellaneous		1,600 00	1,600 00
	Repairs and alterations		4,500 00	4,000 00
	Printing, postage and stationery		1,200 00	1,200 00
			124,320 00	122,542 00
35	ASYLUM FOR THE INSANE, KINGSTON.			
	(For 665 Patients; 665 in 1887.)			
	Salaries.	No. of Officers and Employés.		
	Medical Superintendent	1	1,800 00	2,000 00
	Assistant Physician	1	1,000 00	1,100 00
	Second Assistant Physician	1	700 00	750 00
	Bursar	1	1,300 00	1,300 00
	Clerk	1	850 00	700 00
	Steward	1	500 00	600 00
	Storekeeper	1	650 00	700 00
	Engineer	1	740 00	740 00
	Assistant Engineer	1	300 00	300 00
	Carpenter	1	450 00	450 00
	Baker	1	400 00	400 00
	Tailor	1	500 00	500 00
	Attendant Tradesmen 3			
	Supervisors 7	24	7,252 00	7,178 00
	Ordinary Attendants 12			
	Night Watchers 2			
	Farmer	1	360 00	360 00
	Gardener	1	400 00	400 00
	Butcher	1	240 00	240 00
	Stokers	2	425 00	425 00
	Ploughman	1	360 00	360 00
	Laundryman	1	240 00	240 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employes.	Salaries and Expenses. 1887.	1888.
			$ cts.	$ cts.
35	ASYLUM FOR THE INSANE, KINGSTON—*Continued.*			
	FEMALES.			
	Matron	1	450 00	450 00
	Assistant Matron	1	250 00	250 00
	Trained nurse for Infirmary	1	180 00	180 00
	Seamstress	1	120 00	120 00
	Supervisors 7 / Attendants 14 / Night Watchers 2	23	2,844 00	3,564 00
	Porteress	1	120 00	120 00
	Cooks	3	408 00	408 00
	Laundresses	2	264 00	264 00
	Servants, Dairymaid, etc	3	312 00	312 00
	Expenses.	79	23,415 00	24,411 00
	Medicines		475 00	500 00
	Butchers' meat, fish and fowl		13,000 00	12,500 00
	Butter		4,000 00	4,000 00
	Flour		6,500 00	5,500 00
	Fuel		12,000 00	10,000 00
	Gas and oil		1,000 00	1,000 00
	Groceries		7,500 00	7,500 00
	Fruit and vegetables		1,500 00	1,500 00
	Bedding, clothing, and shoes		8,000 00	8,000 00
	Furniture and furnishings		1,900 00	1,900 00
	Laundry, soap and cleaning		1,700 00	1,700 00
	Printing, postage and stationery		1,100 00	1,100 00
	Farm, feed and fodder		2,850 00	3,000 00
	Repairs		2,500 00	2,500 00
	Miscellaneous		1,800 00	1,800 00
36	ASYLUM FOR THE INSANE, HAMILTON.		89,240 00	86,911 00
	(For 800 Patients; 627 in 1887.)			
	Salaries.	No. of Officers and Employes.		
	Medical Superintendent	1	1,800 00	2,000 00
	Assistant Physician	1	1,000 00	1,150 00
	do (extra allowance 300)		300 00	
	Second Assistant Physician (in new building)	1	700 00	900 00
	Third do	1	700 00	800 00
	Bursar	1	1,100 00	1,300 00
	Bursar's Clerk	1	750 00	800 00
	Storekeeper	1	750 00	750 00
	Engineer	1	650 00	650 00
	Assistant Engineer	1	240 00	240 00
	Stokers	5	480 00	1,200 00
	Carpenters	2	550 00	1,000 00
	Baker	1	450 00	450 00
	Gardener	1	580 00	450 00
	Assistant in store	1		480 00
	Porter and Gatekeeper	1	250 00	250 00
	Chief Attendant	1	300 00	300 00
	Night Watch, Chief	1	365 00	365 00
	do	2	240 00	480 00
	Ordinary Male Attendants	24	4,236 00	5,916 00
	Tailor	1	450 00	450 00
	Farmer	1	450 00	450 00
	Butcher and Yardman	1	240 00	240 00
	Ploughman	1	240 00	240 00
	Messenger and Stableman	1	200 00	240 00
	Farm hand	1	180 00	180 00
	Laundryman	1	240 00	240 00
	Shoemaker	1		240 00
	Cowman	1		180 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Salaries and Expenses. 1887.	1888.
36	ASYLUM FOR THE INSANE, HAMILTON—*Continued.*		$ cts.	$ cts.
	FEMALES.			
	Matron	1	475 00	475 00
	Assistant Matron	1	.....	300 00
	Chief Attendant	1	250 00	250 00
	Supervisors	7	.....	1,218 00
	Ordinary Female Attendants	16	2,280 00	2,400 00
	Night Watchers	3	240 00	360 00
	Cooks	5	372 00	648 00
	Laundresses	3	384 00	384 00
	Housemaids	4	336 00	456 00
	Seamstresses	2	144 00	288 00
		100	21,922 00	28,720 00
	Expenses.			
	Medicines and medical comforts		350 00	400 00
	Fuel		9,970 00	12,000 00
	Butchers' meat, fish and fowl		11,000 00	14,000 00
	Flour, bread, etc		4,500 00	5,400 00
	Butter		3,500 00	4,000 00
	Gas and oil		2,500 00	3,000 00
	Groceries		8,500 00	10,000 00
	Fruit and vegetables		1,500 00	1,500 00
	Bedding, clothing and shoes		6,000 00	7,000 00
	Laundry, soap and cleaning		1,600 00	1,800 00
	Furniture and furnishings		2,000 00	2,500 00
	Farm, feed and fodder		3,000 00	3,500 00
	Repairs and alterations		3,700 00	4,200 00
	Miscellaneous, including rents, etc		1,900 00	2,200 00
	Water supply		1,300 00	1,600 00
	Printing, postage and stationery		800 00	1,000 00
			84,042 00	102,820 00
37	ASYLUM FOR IDIOTS, ORILLIA.			
	(For 375 Patients; 235 in 1887.)			
	Salaries.	No. of Officers and Employes.		
	Medical Superintendent	1	1,600 00	1,600 00
	Bursar	1	1,100 00	1,100 00
	Storekeeper	1	700 00	700 00
	Engineers	2	600 00	1,100 00
	Assistant Engineer	1	340 00	.....
	Gardener	1	300 00	300 00
	Chief Attendent	1	300 00	300 00
	Night Watchers	3	605 00	845 00
	Ordinary Male Attendants	6	1,200 00	1,440 00
	Messenger, Porter and Stable-keeper	1	240 00	240 00
	Carpenter	1	500 00	500 00
	Farmer	1	450 00	450 00
	Stokers	4	.....	960 00
	FEMALES.			
	Matron	1	400 00	400 00
	Housekeeper	1		144 00
	Teacher for feeble-minded children	1	400 00	400 00
	Chief Attendant	1	250 00	250 00
	Ordinary Female Attendants	9	600 00	1,350 00
	Night Attendant	2	120 00	300 00
	Cooks	4	408 00	528 00
	Laundresses	2	252 00	264 00
	Housemaids	7	672 00	840 00
	Seamstresses	2	288 00	300 00
		54	11,325 00	14,311 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Voted for 1887.	Voted for 1888.
37	ASYLUM FOR IDIOTS, ORILLIA—*Continued.*		$ cts.	$ cts.
	Expenses.			
	Medicine and medical comforts		125 00	100 00
	Fuel		3,000 00	7,000 00
	Butcher's meat, fish and fowl		2,400 00	4,000 00
	Flour, bread, etc		2,800 00	5,000 00
	Butter		1,200 00	2,200 00
	Gas and oil		500 00	1,000 00
	Groceries		1,600 00	3,000 00
	Fruit and vegetables		500 00	950 00
	Bedding, clothing and shoes		2,000 00	3,800 00
	Laundry, soap and cleaning		600 00	900 00
	Furniture and furnishings		600 00	1,000 00
	Farm, feed and fodder		700 00	1,500 00
	Repairs		700 00	1,000 00
	Miscellaneous		1,150 00	1,600 00
	Printing, postage and stationery		200 00	400 00
38	CENTRAL PRISON, TORONTO.		29,400 00	47,761 00
	(For 385 Prisoners; 385 in 1887.)			
	Salaries.	No. of Officers and Employés.		
	Warden	1	2,000 00	2,000 00
	Deputy Warden	1	1,300 00	1,300 00
	Bursar	1	1,200 00	1,300 00
	Physician	1	1,000 00	1,000 00
	Clerk and Prison Librarian	1	800 00	800 00
	Steward and Storekeeper	1	750 00	750 00
	Clerk (one-half charged to Industrial Department)		375 00	400 00
	Guards	25	12,325 00	12,325 00
	Engineer	1	890 00	890 00
	Baker	1	500 00	480 00
		33	21,140 00	21,245 00
	Expenses.			
	Hospital expenses and medicines		300 00	300 00
	Butcher's meat and fish		8,500 00	8,500 00
	Flour, bread and meal		5,000 00	5,000 00
	Groceries		4,000 00	4,000 00
	Bedding, clothing and shoes		5,000 00	5,000 00
	Fuel		5,281 56	5,200 00
	Gas and oil		1,000 00	1,000 00
	Water supply		5,800 00	5,800 00
	Laundry, soap and cleaning		2,000 00	2,000 00
	Stationery, advertising, printing and postage		550 00	550 00
	Library, schools and expenses of religious services		1,000 00	1,000 00
	Furniture and furnishings		550 00	550 00
	Stable, forage, etc		700 00	1,000 00
	Grounds		450 00	450 00
	Repairs, etc		600 00	600 00
	Unenumerated		1,000 00	1,000 00
	INDUSTRIAL DEPARTMENT.		62,871 56	63,195 00
	Salaries.	No. of Officers and Employés.		
	Clerk (one-half charged to Maintenance)	1	375 00	400 00
	Shoemaker	1	600 00	600 00
	Tailor	1	600 00	600 00
	Foremen and Instructors	12	4,830 00	4,830 00
	Night Watch	1	450 00	450 00
	Material	..	20,500 00	20,500 00
		16		
	To pay travelling and other expenses *re* change in labor system (re-vote)		350 00	350 00
			90,576 56	90,925 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and Employés.	Salaries and Expenses. 1887.	1888.
			$ cts.	$ cts.
39	ONTARIO REFORMATORY FOR BOYS, PENETANGUISHENE.			
	(For 275 Inmates, 275 in 1887.)			
	Salaries.			
	Superintendent	1	1,600 00	1,600 00
	Assistant Superintendent	1	900 00	900 00
	Bursar	1	850 00	850 00
	Surgeon	1	700 00	700 00
	Chaplains	2	1,200 00	1,200 00
	Steward and Storekeeper	1	550 00	800 00
	Chief Guard (for night duty)	1	500 00	500 00
	School Teachers	3	1,600 00	1,600 00
	Carpenter Instructor	1	600 00	600 00
	Engineer	1	600 00	600 00
	Baker and Cook	1	450 00	450 00
	Instructors in shoe and tailor shop	2	1,150 00	1,150 00
	Farmer	1	450 00	450 00
	Gardener	1	400 00	400 00
	Ordinary Guards	4	1,700 00	1,700 00
	Night Guards	4	2,000 00	2,000 00
	Guard at out-buildings	1	400 00	400 00
	Gate-keeper	1	400 00	400 00
	Organists	2	160 00	160 00
	FEMALES.			
	Matron and Assistant	2	600 00	600 00
		32	16,810 00	17,060 00
	Expenses.			
	Rations		7,000 00	7,000 00
	Clothing		5,000 00	5,500 00
	Farm, farm stock and stables		2,200 00	2,200 00
	Hospital		100 00	300 00
	Library and schools		700 00	700 00
	Fuel		3,500 00	3,500 00
	Cleaning, light and laundry		1,200 00	1,200 00
	Furniture, tools and shop fixtures		900 00	900 00
	Workhops, tools and fixtures		700 00	700 00
	Repairs, ordinary		1,000 00	1,500 00
	Incidentals (recaptures, freight, rent. etc.)		2,200 00	2,200 00
	Postage and stationery		600 00	600 00
			41,910 00	43,360 00
40	INSTITUTION FOR THE DEAF AND DUMB, BELLEVILLE.			
	(For 260 pupils; 260 in 1887.			
	Salaries.			
	Superintendent	1	1,600 00	1,600 00
	Physician	1	650 00	650 00
	Bursar	1	850 00	850 00
	Matron and Housekeeper	1	425 00	400 00
	Teachers	14	8,762 50	8,762 50
	Storekeeper and Clerk	1	550 00	600 00
	Engineer	1	600 00	600 00
	Stoker	1	300 00	300 00
	Farmer	1	400 00	400 00
	Teamster	1	216 00	216 00
	Gardener	1	300 00	300 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Continued.*

No. of Vote.	SERVICE.	No. of Officers and employes.	Salaries and Expenses. 1887.	1888.
			$ c s.	$ cts.
40	INSTITUTION FOR THE DEAF AND DUMB, BELLEVILLE.—*Continued.*			
	Salaries.			
	Baker	1	425 00	425 00
	Night Watchman	1	275 00	300 00
	Carpenter and Assistant	2	700 00	700 00
	Shoemaker	1	550 00	550 00
	Messenger	1	168 00	168 00
	Cook	1	168 00	168 00
	Small Boys' and Girls' Nurses	2	240 00	240 00
	Maid, Laundresses and Cook's Assistant	12	1,356 00	1,356 00
	Supervisor of Boys	1	500 00	500 00
	Assistant Supervisor of Boys	1	300 00	300 00
	Seamstress and Supervisor of Girls	1	240 00	240 00
		48	19,575 50	19,625 50
	Expenses.			
	Medicines and Medical Comforts		125 00	125 00
	Butchers' meat, fish and fowl		3,600 00	3,600 00
	Flour		1,900 00	1,900 00
	Butter		2,100 00	2,100 00
	Groceries		2,000 00	2,000 00
	Fruit and vegetables		450 00	450 00
	Bedding, clothing and shoes		900 00	900 00
	Fuel		3,700 00	3,700 00
	Gas and oil		1,200 00	1,200 00
	Laundry, soap and cleaning		400 00	400 00
	Furniture and furnishings		450 00	450 00
	Farm, feed and fodder		700 00	700 00
	Repairs and alterations		900 00	900 00
	Advertising, printing, stationery and postage		650 00	650 00
	Books, apparatus and appliances		600 00	600 00
	Unenumerated		800 00	1,050 00
			40,050 50	40,350 50
41	INSTITUTION FOR THE BLIND, BRANTFORD.			
	(For 190 pupils; 190 in 1887.)			
	Salaries.	No. of Officers and Employes.		
	Principal	1	1,600 00	1,600 00
	Physician	1	600 00	600 00
	Bursar	1	800 00	800 00
	Matron	1	400 00	400 00
	Teachers	15	5,921 00	5,796 00
	Trade Instructor	1	1,100 00	1,100 00
	Visitors' Attendant	1	156 00	156 00
	Carpenter	1	424 00	424 00
	Engineer	1	600 00	600 00
	Assistant Engineer	1	360 00	460 00
	Fireman in winter and farm hand in summer	1	252 00	276 00
	Gardener	1	384 00	400 00
	Teamster	1	268 00	288 00
	Porter and Messenger	1	228 00	240 00
	Cook and Baker	2	556 00	568 00
	Cook's Assistant	1	120 00	120 00
	Maids	3	984 00	984 00
	Laundress	1	168 00	168 00
	Laundress's Assistants	2	216 00	216 00
	Nurses	3	380 00	380 00
	Night Watchman	1	300 00	300 00
	Temporary Assistance, including extra farm hands in summer		350 00	350 00
		47	16,167 00	16,226 00

V.—PUBLIC INSTITUTIONS MAINTENANCE—*Concluded.*

No. of Vote.	SERVICE.	No. of Officers and Employes.	Salaries and Expenses. 1887.	Salaries and Expenses. 1888.
	INSTITUTION FOR THE BLIND, BRANTFORD—*Continued.*		$ cts.	$ cts.
	Expenses.			
	Medicine and medical comforts		100 00	100 00
	Butchers' meat, fish and fowl		3,100 00	3,100 00
	Flour, bread, etc		1,100 00	1,100 00
	Butter		1,100 00	1,100 00
	General groceries		2,000 00	2,000 00
	Fruit and vegetables		250 00	250 00
	Bedding, clothing and shoes		500 00	500 00
	Fuel		3,800 00	3,800 00
	Gas, oil and candles		1,200 00	1,200 00
	Laundry, soap and cleaning		350 00	350 00
	Furniture and furnishings		400 00	400 00
	Farm, feed and fodder		900 00	900 00
	Repairs and alterations		500 00	500 00
	Advertising, printing, stationery and postage		600 00	600 00
	Books, apparatus and appliances		750 00	1,100 00
	Unenumerated		1,000 00	1,000 00
			33,817 00	34,226 00
42	ANDREW MERCER REFORMATORY FOR FEMALES AND REFUGE FOR GIRLS, TORONTO.			
	(For 210 inmates, 210 in 1887.)			
	Salaries.			
	Superintendent	1	900 00	900 00
	Deputy Superintendent	1	600 00	600 00
	Secretary	1	300 00	300 00
	Physician	1	800 00	800 00
	Bursar and Storekeeper	1	750 00	800 00
	Teacher and Housekeeper for Refuge	1	500 00	500 00
	Instructors	3	700 00	700 00
	Attendants	8	1,380 00	1,380 00
	Gatekeeper and Visitors' Attendant	1	120 00	120 00
	Cook and Baker	1	168 00	168 00
	Chief Attendant	1	200 00	200 00
	Maid	1	108 00	108 00
	Engineer	1	600 00	600 00
	Assistant Engineer	1	500 00	500 00
	Night Watch	1	400 00	400 00
	" females	1	200 00	200 00
	Messenger	1	400 00	400 00
	Outside Night Watch	1	400 00	400 00
	Gardener	1	400 00	400 00
		28	9,426 00	9,476 00
	Expenses.			
	Hospital expenses and medicines		150 00	200 00
	Butchers' meat and fish		2,400 00	2,400 00
	Flour, bread and meal		1,600 00	1,600 00
	Groceries		3,000 00	3,500 00
	Bedding, clothing and shoes		2,100 00	2,100 00
	Fuel		3,000 00	3,500 00
	Gas and oil		800 00	800 00
	Laundry, soap, cleaning and water		2,200 00	2,200 00
	Stationery, advertising, postage, etc		400 00	400 00
	Library, schools and lectures		500 00	500 00
	Furniture and furnishings		600 00	6 0 00
	Grounds and garden		800 00	800 00
	Repairs		400 00	400 00
	Unenumerated		1,000 00	1,000 00
	For manufacturing operations		1,500 00	1,500 00
			29,876 00	30,976 00

VI.—IMMIGRATION.

To be voted per Statement (A).....$7,700 00

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
43		$ cts.	$ cts.	$ cts.	$ cts.
	Agencies in Europe	5,150 00	5,150 00		
	Agencies in Ontario	2,250 00	550 00		1,700 00
	Allowance for maps, circulars and literature	2,000 00	2,000 00		
	Carriage of Immigrants in Ontario	3,500 00			3,500 00
	Provisions for immigrants at Toronto, including medical attendance	3,000 00			3,000 00
	Incidentals	1,000 00			1,000 00
		16,900 00	7,700 00		9,200 00

No. of Vote.	SERVICE.	Salaries and Expenses.	
		1887.	1888.
43	DETAILS.	$ cts.	$ cts.
	AGENCIES IN EUROPE.		
	Agent in Liverpool	2,000 00	2,000 00
	Clerk	850 00	850 00
	Travelling expenses	600 00	600 00
	Advertising, printing and contingencies	1,000 00	1,000 00
	Office rent and expenses, including fuel, stationery, etc	700 00	700 00
		5,150 00	5,150 00
	AGENCIES IN ONTARIO.		
	Allowance for constable at railway station and sheds	550 00	550 00
	Agency at Gravenhurst	150 00	
	Agency at Parry Sound	100 00	
	Departmental Clerk	850 00	
	Travelling expenses in settling immigrants, printing, advertising, and collecting information for tenant farmers, etc	600 00	
		2,250 00	550 00

VII.—AGRICULTURE.

To be voted per Statement (A)..... $135,631 00

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887. Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
44	Agriculture	139,886 00	135,631 00	.....	4,255 00

No. of Vote.	SERVICE.	Voted for 1887.	1888.
44	DETAILS.	$ cts.	$ cts.
	(a) AGRICULTURE.		
	Electoral Division Societies, 85 at $700	59,500 00	59,500 00
	" 1 at 550	550 00	550 00
	" 4 at 350	1,400 00	1,400 00
	" Outlying Districts	2,000 00	2,000 00
	Fruit Growers' Association	1,800 00	1,800 00
	Entomological Society.....	1,000 00	1,000 00
	Dairymen's Associations.....	3,000 00	3,000 00
	Agricultural Associations.....	10,000 00	4,500 00
	Ontario Experimental Union.....	150 00	150 00
	Ontario Creamery Association.....	1,000 00	1,000 00
	Poultry Association.....	600 00	600 00
	Beekeepers' Association.....	500 00	500 00
	Travelling expenses of Professors attending Farmers' Institutes.....	1,050 00	1.000 00
	Farmers' Institutes, a grant of $25 to one Institute in each Electoral District, on condition that an equal sum be granted by the County Council, and on such further conditions as may be imposed by regulations of Commissioner of Agriculture.....	2,000 00	2,000 00
	Provincial Institute.....	.....	500 00
	For sundry services in connection with Agriculture and Arts—such as investigations of disease in animals and crops, and of ravages of insects; printing reports, and for agricultural instruction, dairy products, travelling expenses and contingencies, not otherwise provided for	4,900 00	4,000 00
	Forestry	2,000 00	2,000 00
	Tree-planting—Bonus to Municipalities under 46 Vic., chap. 36	1.000 00	1,000 00
	BUREAU OF STATISTICS.		
	Secretary and Assistant Commissioner of Agriculture	2,000 00	2,200 00
	Assistant Secretary	1,650 00	1,650 00
	Clerk	1,000 00	1,100 00
	"	850 00	850 00
	"	750 00	750 00
	"	750 00	750 00
	" and Shorthand Writer	.....	750 00
	Half wages of Messenger and Fireman (half to Board of Health).....	425 00	425 00
	Printing, stationery, postage, and collection of labour and mining statistics, etc.....	6,000 00	6,500 00
		105,875 00	101,475 00
	ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM.		
	(130 Students.)		
	(a) *Salaries and Wages.*		
	President, Resident Master, Professor of English Literature and Political Economy	2,000 00	2,000 00
	Professor of Agriculture and Farm Superintendent.....	2,000 00	2,000 00

VII.—AGRICULTURE—*Concluded.*

No. of Vote.	SERVICE.		Voted for 1887.	Voted for 1888.
			$ cts.	$ cts.
44	ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM—*Continued.*			
	(a) Salaries and Wages.			
	Professor of Dairying, etc.		1,500 00	1,750 00
	" Chemistry		1,400 00	1,400 00
	" Geology and Natural History		1,500 00	1,500 00
	" Veterinary Science		800 00	800 00
	Mathematical and Assistant Resident Master		900 00	900 00
	Bursar		900 00	900 00
	Physician		300 00	300 00
	Instructor in Drill and Gymnastics		150 00	150 00
	Matron and Housekeeper		400 00	400 00
	Engineer		700 00	740 00
	Assistant Engineer for six months		210 00	210 00
	Stoker, six months		120 00	120 00
	Janitor, Messenger and Librarian		240 00	240 00
	Night Watchman and Assistant in looking after Students in Boarding-house for nine months		225 00	225 00
	Temporary assistance		100 00	100 00
			13,445 00	13,735 00
	(b) Expenses of Boarding House.			
	Meat, fish and fowl		4,300 00	4,000 00
	Bread and biscuit		1,300 00	1,000 00
	Groceries, butter and fruit		4,200 00	4,000 00
	Laundry, soap and cleaning		300 00	300 00
	Women servants for Boarding-house—Cooks, Laundresses, etc		1,820 00	1,700 00
	Advertising, printing, postage and stationery		700 00	700 00
	Maintenance of chemicals		200 00	200 00
	Library (books, papers and periodicals)		250 00	250 00
	Medals		100 00	100 00
	Unenumerated		700 00	700 00
			27,315 00	26,685 00
	Less revenue (reduced by admission of free students)		7,500 00	6,000 00
			19,815 00	20,685 00
	II.—EXPERIMENTAL FARM.			
	Farm Foreman		700 00	700 00
	Garden Foreman		700 00	700 00
	Mechanical Foreman		700 00	700 00
	Student Instructor	396 00		
	Assistant Superintendent of Experiments	500 00		
	Farm labour, including ploughmen, cattlemen, shepherds, etc.	2,150 00		
	Machinery and implements (new and repairs)	1,425 00		
	Live Stock	2,000 00		
	Feed, fodder, etc	1,500 00		
	Farm seeds and special manures, etc	400 00		
	Advertising, postage, stationery, etc	300 00		
	Experiments in cropping, feeding, dairying, manures, etc.	2,000 00		
	Permanent improvements, draining, fencing, etc., and mechanical repairs, lumber, etc., including wages of carpenter	2,000 00		
	Tree-planting on wood lots (re-vote)	300 00		
	Garden, orchard and lawn, including trees, plants, labour, manures, etc	2,800 00		
	Miscellaneous	600 00		
		16,371 00		
	Less estimated farm revenue, 1887	5,000 00	12,096 00	11,371 00
			14,196 00	13,471 00
			139,886 00	135,631 00

VIII.—HOSPITALS AND CHARITIES.

To be voted per Statement (A).....$113,277 24.

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
45	For Hospitals and Institutions mentioned in Schedule "A" of Statute.....	57,939 66	63,674 58	5,734 92	
	For Institutions, Schedule "B".....	31,176 54	32,105 10	928 56	
	" " "C".....	16,705 36	17,197 56	492 20	
	For printing, stationery and other contingencies connected with above Institutions....	300 00	300 00	.....	
	Total.....	106,121 56	113,277 24	7,155 68	

IX.—MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS.

To be voted per Statement (A)..... $62,976 43

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
46	Government House.....	7,500 00	8,174 00	674 00	
	Parliament Buildings				
47	Main Building.....	9,900 00	10,374 26	474 26	
48	West Wing.....	2,800 00	3,274 20	474 20	
49	East Wing	4,050 00	4,524 20	474 20	
50	Education Department (Normal School Building)	7,900 00	8,700 00	800 00	
51	Rented premises, Simcoe Street.....	2,700 00	2,760 00	60 00	
52	" " Wellington Street.....	.....	2,700 00	2,700 00	
53	Miscellaneous	2,990 00	3,042 00	52 00	
54	Normal School, Ottawa.....	3,000 00	3,350 00	350 00	
55	School of Practical Science.....	1,200 00	1,200 00		
56	Agricultural College	6,000 00	6,000 00		
57	Agricultural Hall	500 00	500 00		
58	Osgoode Hall.....	8,040 00	8,377 77	337 77	
		56,580 00	62,976 43	6,396 43	

IX.—MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	Expenses. 1887.	1888.
	DETAILS.	$ cts.	$ cts.
46	GOVERNMENT HOUSE.		
	Expenses.		
	Water	650 00	650 00
	Gas	1,350 00	1,350 00
	Fuel	2,200 00	2,200 00
	Repairs	1,500 00	1,500 00
	Furnishings	1,000 00	1,000 00
	Plantings and plants	500 00	500 00
	Contingencies (clearing away snow, carting ashes, sweeping flues, etc.)	300 00	300 00
	Unpaid water account (arrears)		674 00
		7,500 00	8,174 00
47	PARLIAMENT BUILDINGS.—MAIN BUILDING.		
	Repairs and furniture	6,000 00	6,000 00
	Fuel	1,600 00	1,600 00
	Gas and other lighting	1,700 00	1,700 00
	Water	600 00	600 00
	Unpaid water account (arrears)		474 26
		9,900 00	10,374 26
48	PARLIAMENT BUILDINGS, WEST WING.—CROWN LANDS DEPARTMENT.		
	Repairs and furniture	1,600 00	1,600 00
	Fuel	700 00	700 00
	Water	500 00	500 00
	Unpaid water account (arrears)		474 20
		2,800 00	3,274 20
49	EAST WING.—TREASURY DEPARTMENT AND SECRETARY AND REGISTRAR'S DEPARTMENT.		
	Repairs and furniture	2,500 00	2,500 00
	Fuel	750 00	750 00
	Water	500 00	500 00
	Gas	300 00	300 00
	Unpaid water account (arrears)		474 20
		4,050 00	4,524 20
50	EDUCATIONAL DEPARTMENT.—NORMAL AND MODEL SCHOOLS, TORONTO.		
	Furniture and furnishings	1,500 00	1,500 00
	Expenses of grounds	400 00	800 00
	Fuel and light	3,800 00	3,800 00
	Water	850 00	1,000 00
	Repairs, including museum, etc.	750 00	1,000 00
	Carpenter, (formerly paid out of contingencies)	600 00	600 00
		7,900 00	8,700 00
51	RENTED PREMISES ON SIMCOE STREET.—ATTORNEY-GENERAL'S DEPARTMENT.		
	Fuel, gas and water	800 00	800 00
	Rent	1,200 00	1,200 00
	Repairs and furniture	700 00	700 00
	Unpaid water account (arrears)		60 00
		2,700 00	2,760 00

IX.—MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS—*Concluded.*

No. of Vote.	SERVICE.	Expenses. 1887.	1888.
	DETAILS.	$ cts.	$ cts.
52	RENTED PREMISES ON WELLINGTON STREET.—PUBLIC WORKS DEPARTMENT AND INSPECTORS OF FACTORIES.		
	Fuel, gas and water		400 00
	Rent		600 00
	Repairs and furniture		350 00
			1,350 00
	Alterations and fittings to building, removal, etc		1,350 00
			2,700 00
53	MISCELLANEOUS.		
	General Clerk of Works and Repairs for Public Institutions	1,200 00	1,200 00
	Carpenter (engaged in Government buildings generally)	720 00	720 00
	Plumber and Assistant (engaged in Government buildings generally)	1,070 00	1,122 00
		2,990 00	3,042 00
54	NORMAL SCHOOL, OTTAWA.		
	Expenses of grounds	400 00	400 00
	Fuel and light	1,400 00	1,600 00
	Water	450 00	600 00
	Repairs and furniture	750 00	750 00
		3,000 00	3,350 00
55	SCHOOL OF PRACTICAL SCIENCE.		
	Gas	150 00	150 00
	Fuel	500 00	500 00
	Water	100 00	100 00
	Repairs and furniture	450 00	450 00
		1,200 00	1,200 00
56	AGRICULTURAL COLLEGE.		
	Furniture and furnishings	550 00	550 00
	Repairs and alterations	650 00	650 00
	Fuel	3,150 00	3,150 00
	Light	1,100 00	1,100 00
	Water	550 00	550 00
		6,000 00	6,000 00
57	AGRICULTURAL HALL.		
	Fuel and light	500 00	500 00
		500 00	500 00
58	OSGOODE HALL.		
	Fuel and light	5,000 00	5,000 00
	Salaries of Engineer and Fireman	1,140 00	1,140 00
	Water	500 00	500 00
	Repairs and furniture	1,400 00	1,400 00
	Unpaid water account (arrears)		337 77
		8,040 00	8,377 77

X.—PUBLIC BUILDINGS.

To be voted per Statement (A)..... $281,412.20.

No. of Vote.	A.	1888. Re-vote estimated.	1888. New Vote.
		$ cts.	$ cts.
59	Asylum for the Insane, Toronto		13,990 60
60	" " London		30,687 00
61	" " Hamilton	40,000 00	44,229 39
62	" " Kingston		8,600 00
63	Branch Asylum, Kingston		200 00
64	Asylum for Idiots, Orillia	25,000 00	53,182 21
65	Provincial Reformatory, Penetanguishene		8,565 00
66	Reformatory for Females, Toronto		2,969 50
67	Central Prison, Toronto		2,400 00
68	Deaf and Dumb Institute, Belleville		4,352 00
69	Blind Institute, Brantford		1,786 50
70	Agricultural College, Guelph	3,000 00	2,750 00
71	Education Department and Normal and Model School, Toronto		23,300 00
72	Normal School, Ottawa		2,000 00
73	School of Practical Science, Toronto		2,000 00
74	Osgoode Hall, Toronto		2,000 00
75	Government House, Toronto		3,000 00
76	Parliament Buildings, Toronto		2,000 00
77	Algoma District	500 00	800 00
78	Thunder Bay District	500 00	500 00
79	Muskoka District		500 00
80	Parry Sound District		500 00
81	Nipissing District		500 00
82	Rainy River District		1,300 00
83	Miscellaneous	100 00	200 00
		69,100 00	212,312 20
	Re-votes included in above	69,100 00	
	Expenditure on capital account (new)	184,515 70	Voted for 1887.
	Expenditure for repairs	27,796 50	
		281,412 20	313,334 11

X.—PUBLIC BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1888.	
59	DETAILS.	$ cts.	$ cts.
	Asylum for Insane, Toronto.		
	General repairs, drains, etc	500 00	
	To complete new kitchen	700 00	
	Fire escape for main building	1,200 00	
	" for each cottage, $300 (2)	600 00	
	Furniture and furnishings (Inspector)	4,844 00	
	Material for verandahs, wire screens, etc	850 00	
	Connections between wings, repairs and rebuilding	500 00	
	Materials for rebuilding ice house	350 00	
	Lumber for general repairs	817 00	
	Miscellaneous	1,656 00	
	Sundries for Engineer's department	470 00	
	Materials for Laundry, Women's departments	400 00	
	do for covered way from kitchen to wings	500 00	
	do for new kitchen, unpaid account	603 60	
			13,990 60
60	*Asylum for Insane, London.*		
	General repairs, drains, etc	500 00	
	Reconstruction of portion of main building injured by fire	15,000 00	
	New pumping engine and hydrants for fire protection	8,000 00	
	Alterations in east workshop for new laundry, etc	3,000 00	
	New boiler for steam cooking in kitchen	800 00	
	Furniture and furnishings (Inspector)	1,425 00	
	Hardwood flooring, 25,000 feet do	1,200 00	
	Materials for repairs and basement, north building do	475 00	
	To cover accounts for 1887, previous to December 31st do	287 00	
			30,687 00
61	*Asylum for Insane, Hamilton.*		
	General repairs, drains, etc	500 00	
	Drain to carry off surface water from grounds	1,400 00	
	Re-vote of unexpended balance of cottages	40,000 00	
	New pumping engine and water supply from engine house	7,500 00	
	Addition to Medical Superintendent's residence	1,600 00	
	Furniture and furnishings (Inspector)	1,125 00	
	To complete furnishings of new cottage do	10,000 00	
	Forcing and propagating house do	1,000 00	
	Materials for improvement of heating Main Building do	800 00	
	Additional land do	19,000 00	
	To cover amount for 1887 previous to December 31st do	1,304 39	84,229 39
62	*Asylum for Insane, Kingston.*		
	General repairs, drains, etc	500 00	
	Repairs to Gatekeeper's cottage, including mansard roof	400 00	
	Pointing mason work of main building and walls	2,500 00	
	Alteration of pipes for hot water boiler	800 00	
	Furniture and furnishings (Inspector)	1,800 00	
	Repairs to house, fencing on new Court property do	1,500 00	
	New laundry engine on new Court property do	500 00	
	Renewal of heating apparatus, North Cottage do	600 00	
			8,600
63	*Branch Asylum, Kingston.*		
	General repairs, drains, etc	200 00	
			200 00
64	*Asylum for Idiots, Orillia.*		
	General repairs, drains, etc. (old building)	300 00	
	Revote of unexpended balance, new cottages	25,000 00	
	Main front building, total estimated cost $100,000, required for this year	40,000 00	
	Furniture and furnishings (Inspector)	8,300 00	
	Fences and improvements to farm do	1,000 00	
	Materials for ice-house do	300 00	
	To cover amounts for 1887 previous to December 31st do	3,282 21	
			78,182 21

X.—PUBLIC BUILDINGS—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1888.	
	DETAILS.	$ cts.	$ cts.
65	*Reformatory for Boys, Penetanguishene.*		
	General repairs, drains, etc	400 00	
	To complete stable, etc	1,200 00	
	New piggeries and sheds	800 00	
	Duplicate pumps and new water tanks	3,000 00	
	Furniture and furnishings (Inspector)	350 00	
	Repairs and alterations, ventilating pipes, etc., do	590 00	
	Concrete for basement and ante-room floors do	700 00	
	Painting, varnishing and whitewashing building do	450 00	
	Materials for pine sheeting for basement, plastering, etc., do	725 00	
	New oven for bakery do	350 00	
			8,565 00
66	*Reformatory for Females, Toronto.*		
	General repairs, drains, etc	400 00	
	To complete repairs of water pipes in basement	600 00	
	Alteration of w.c.'s in centre building and workshop	500 00	
	Furniture and furnishings, (Inspector)	200 00	
	Materials for fencing, lumber for ceiling, painting, etc. do	700 00	
	Building new oven, outstanding account do	219 50	
	Coal cellar for Refuge do	350 00	
			2,969 50
67	*Central Prison, Toronto.*		
	General Repairs, drains, etc	500 00	
	Furniture and furnishings (Inspector)	400 00	
	Repairs and alterations, lumber, slating, tracks, etc. do	1,200 00	
	Library for purchase of books do	300 00	
			2,400 00
68	*Institution for the Deaf and Dumb, Belleville.*		
	General repairs, drains, etc	400 00	
	Re-construction of wharf at pumping engine-house	800 00	
	Furniture and furnishings (Inspector)	1,250 00	
	Material for hardwood flooring, ice house, etc. do	698 00	
	Sundries for Engineer's department do	324 00	
	" Education " do	350 00	
	Grounds, sidewalks for girls, gravel, etc. do	300 00	
	New oven for bakery do	230 00	
			4,352 00
69	*Institution for the Blind, Brantford.*		
	General repairs, drains, etc	300 00	
	Furniture and furnishings (Inspector)	657 00	
	Repairs and alterations, pump house boiler, wire guards, etc. do	304 50	
	Grounds, trees, roads, plank walk, etc do	525 00	
			1,786 50
70	*Agricultural College, Guelph.*		
	General repairs, drains, etc	400 00	
	Re-vote—alterations in museum and for carriage-house	3,000 00	
	Apparatus for new Laboratory	550 00	
	Farm office, piggery and experimental barn	1,400 00	
	Furniture and furnishings	400 00	
			5,750 00
71	*Education Department and Normal and Model School, Toronto.*		
	Additional storey, new roof and alterations in Model School	20,000 00	
	General repairs, painting, drains, etc	2,000 00	
	New slate roofs over decks, front building	800 00	
	Furniture and furnishings	500 00	
			23,300 00

X.—PUBLIC BUILDINGS—*Concluded.*

No. of Vote.	SERVICE.	To be voted for 1888.	
	DETAILS.	$ cts.	$ cts.
72	*Normal School, Ottawa.*		
	General repairs, painting, drains, etc.	1,500 00	
	Furniture and furnishings	500 00	
			2,000 00
73	*School of Practical Science, Toronto.*		
	General repairs, painting, drains, etc.	1,500 00	
	Furniture and furnishings	500 00	
			2,000 00
74	*Osgoode Hall, Toronto.*		
	General repairs, painting, drains, etc.	1,500 00	
	Furniture and furnishings	500 00	
			2,000 00
75	*Government House, Toronto.*		
	General repairs, furniture, etc.	3,000 00	
			3,000 00
76	*Parliament Buildings, Toronto.*		
	General repairs, furniture, etc.	2,000 00	
			2,000 00
77	*Algoma District.*		
	Re-vote of unexpended balance	500 00	
	Repairs and furniture, gaol and lock-ups	500 00	
	Addition to Registry office, Sault Ste. Marie	300 00	
			1,300 00
78	*Thunder Bay District.*		
	Re-vote of unexpended balance	500 00	
	Repairs and furniture, gaol and lock-up	500 00	
			1,000 00
79	*Muskoka District.*		
	Repairs and furniture, lock-up, etc.	500 00	
			500 00
80	*Parry Sound District.*		
	Repairs and furniture, lock-ups	500 00	
			500 00
	Nipissing District.		
	Repairs and furniture, lock-up, etc.	500 00	
			500 00
82	*Rainy River District.*		
	Repairs and furniture, gaol, etc., Rat Portage	200 00	
	Addition to Court-room, etc. do	800 00	
	Do to Gaoler's residence for kitchen	300 00	
			1,300 00
83	*Miscellaneous.*		
	Repairs to Brock's monument	200 00	
	Do Registry office, Minden, re-vote	100 00	
			300 00

XI.—PUBLIC WORKS.

To be voted per Statement (A) ..... $50,496.00.

No. of Vote.	A.	1888.
		$ cts.
84	Public Works	50,496 00

No.	SERVICE.	Re-vote.	New Vote.
		$ cts.	$ cts.
84	*Otonabee River Works:*		
	Stop-log piers, etc., above Young's Point Lock.....	.....	2,365 00
	Kushog Lake Dam:		
	To aid County of Haliburton in re-construction of dam at outlet of Kushog Lake	.....	300 00
	Peninsula Creek Improvement:		
	To complete dredging...	1,410 00	3,000 00
	Balsam River Works:		
	For partial renewal and re-construction of lock.....	7,229 00	
	Scugog River Work:		
	Dredging Drummond's Bay Channel.....	.....	5,000 00
	Maganetewan Works:		
	To meet estimated balance due contractor for lock works and to construct piers below Deer Lake dam,.....	2,892 00	700 00
	Mary's and Fairy Lakes Works:		
	To re-construct bridge over north branch of Muskoka River, and also bridge above lock.....	.....	7,700 00
	Muskoka Lake Works:		
	To re-construct bridge at Port Carling	.....	1,300 00
	Georgian Bay:		
	To improve inner channel	.....	3,000 00
	Maintenance Locks, Dams and Swing Bridges.....	....	6,800 00
	Surveys, Inspections, Arbitrations and Awards and charges not otherwise provided for.....	....	5,000 00
	Superintendent Locks, Dams and Bridges....	.....	1,200 00
	Lockmasters', Caretakers' and Bridge-tenders' salaries.....	....	2,600 00
		11,531 00	38,965 00
	SUMMARY.		
	Re-vote included in above.....	11,531 00	voted for
	Expenditure on capital account (new)	19,365 00	1887.
	do for repairs and maintenance..... .	19,600 00	
		50,496 00	61,061 00

XII.—COLONIZATION ROADS.

To be voted per Statement $101,600 00

No. of Vote.	A.	To be Voted for 1888.	
		$ c.	$ c.
	North Division	21,700 00	
	West Division	15,900 00	
	East Division	38,000 00	
	General Purposes	26,000 00	
			101,600 00

No. of Vote.	SERVICE.	To be voted for 1888.	
		$ c.	
	North Division.		
	Cockburn Island Roads—to continue further improvements	500 00	
	Coyne's Road—extension northward	800 00	
	Coffin (2nd and 3rd con.) Road—to complete about one mile and bridge Thessalon River	500 00	
	Galbraith Road—repairs between concessions 1 and 2 of Galbraith	500 00	
	Grand Portage Road—to continue to Mississaga River and build bridge on lot 5, con. 6, Wells	900 00	
	Kaministiquia Bridge—repairs and renewals to guard against ice jams and freshets	4,000 00	
	Mississaga Road—to complete between Blind River and Mississaga iron bridge	1,000 00	
	Manitoulin Island Roads	3,500 00	
	Nepigon Road—to construct between Nepigon and Helen Lakes	1,000 00	
	Oliver Township Roads—to repair certain roads and build bridge over Neebing River	1,000 00	
	Parkinson Road—to continue northward	1,000 00	
	Rabbit Mountain and Whitefish Lake Road—to complete work of last season and extend. ($250 to be contributed by settlers towards extension)	2,000 00	
	Rainy River Road—to continue construction towards mouth of Rainy River	3,000 00	
	St. Joseph Island Roads	2,000 00	
			21,700 00

COLONIZATION ROADS.—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1888.	
85	*West Division*	$ cts.	$ cts.
	Bracebridge Road—on town line between Macaulay and Draper—to repair and extend eastward	1,000 00	
	Brunel Branch Road—to construct between Lake of Bays and Peninsula Lake	800 00	
	Christie Road—repairs east and west of Edgington	500 00	
	Chaffey Road—repairs to Novar	800 00	
	Golden Valley Road—to complete connection in Mills	800 00	
	McKellar (10 and 11 concession) Road—to construct—from McKellar eastward	1,000 00	
	Monck (15 and 16 side line) Road—to further open	800 00	
	Monteith and Perry Road—to complete deviation	500 00	
	Missionary Road—to repair in Township Ryerson	500 00	
	New Jerusalem Road—to produce eastward	500 00	
	Northern Road—repairs between Golden Valley Road and Commauda	800 00	
	North West Road—to repair from work done two years ago	500 00	
	Parry Sound Road—chiefly bridge repairs	1,000 00	
	Ryerson Centre Road—to connect with Maganetawan Road	600 00	
	Stisted Swamp Road—to continue west between concessions 4 and 5 Stisted	500 00	
	Scotia Junction Road—to construct—to give settlers access to Monteith and Perry Road	800 00	
	Surprise Lake Road—To build bridge and extend road from South River	1,000 00	
	Strong (30 side line) Road—to build bridge and improve road	500 00	
	Shawanaga Lake Road—to produce to west town line of Hagerman	500 00	
	Westphalia Road—to continue construction between concessions 4 and 5 of Gurd	2,000 00	
	Whitestone Valley Road—to continue westward in Township of Mackenzie	500 00	
			15,900 00
	East Division.		
	Alice "B" Line Road—to repair road and bridge	600 00	
	Addington Road (south)—to repair south of Ontario and Quebec Railway.	500 00	
	Addington Road (north)—to repair from Peterson road southward.	500 00	
	Beachburg and Cobden Road—to continue repairs	500 00	
	Bobcaygeon Road—to continue repairs between Kinmount and Minden	1,000 00	
	Bobcaygeon Road—to repair bridges in Township of Sherborne	400 00	
	Bear Creek Bridge—to construct on 9th con. line of Glamorgan	500 00	

COLONIZATION ROADS.—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1888.	
85	*East Division.—Continued.*	$ cts.	$ cts
	Buckhorn Road—to repair bridges and road injured by fire in Cavendish.	400 00	
	Burleigh Road—to repair south end, conditional upon equal grants from county and municipality	250 00	
	Bell's Rapids Road—to extend northward into Township of Bangor	300 00	
	Cross Lake Bridge—to repair floating bridge in Kennebec	500 00	
	Coe Hill Road— to improve from Coe Hill northerly towards Faraday Township	300 00	
	Calabogie Bridge—conditional that the further sum necessary to complete the bridge be contributed by the Municipality of Bagot and Blythfield and the Railway Company	2,000 00	
	Callender and North Bay Road—to construct northerly between concessions 8 and 9, Bonfield	900 00	
	Dalton and Washago Road—repairs between Ryde and Dalton	500 00	
	District Line (between Bromley and Wilberforce)—to continue from last year's work southward	500 00	
	District Line Road (between Stafford and Alice)—to improve and repair gullies	800 00	
	Frontenac Road—repairs from Ardoch to Soles	1,000 00	
	Graham's Bridge (on lot 20, concession 2, Westmeath)—to repair	500 00	
	Hagarty (10 and 11 Side Line) Road—to open through concessions 3 and 4	500 00	
	Hagarty and Brudenel Road—to improve	500 00	
	HaliburtonRoad—to repair between concessions 2 and 3, from lot 26, Minden, to Haliburton	500 00	
	Harvey Road—improvements, conditional upon grants of $200 from each, the County of Peterborough and Township of Harvey	400 00	
	Herschel and Faraday, Town Line Road	500 00	
	Hastings Road—repairs south of Ontario Central Railway, and repairs also south of Maynooth	700 00	
	Hastings Road (old location)—to improve between Millbridge and Murphy's Corners, conditional upon a grant of $150 from the County of Hastings and $25 each from the Townships of Marmora and Lake, Tudor and Cashel $50	200 00	
	Lonsdale and Bridgewater Road—to continue, conditional upon a like grant from County Council of Hastings	300 00	
	Lake Township Road—to construct, conditional upon a like grant from County Council of Hastings	250 00	
	Lavant Road and Lavant Branch Road—to repair the former and complete the latter	800 00	
	Mississippi Road—to repair from Ompah to Mississippi River	400 00	
	Mackay's Station and Petewawa Road—from Mackay's Station southward towards Petewawa River	700 00	

COLONIZATION ROADS.—*Continued.*

No. of Vote.	SERVICE.	To be voted for 1888.	
85	*East Division.—Continued*	$ cts.	$ cts.
	Monmouth Road—repairs between Burleigh Road and Haliburton	500 00	
	Mattawa and Callender Road—to construct between Callender and Mattawa	1,000 00	
	Mattawa and L'Amble Du Fond Road—to grade road in Townships of Calvin and Papineau	900 00	
	North Bay and Temiscamingue Road—to continue towards Lake	4,000 00	
	North Bay and Trout Lake Road—to continue on north side of Trout Lake eastward	800 00	
	Nosbonsing Road—to continue towards Lake Nosbonsing	800 00	
	Opeongo Road—to repair Constant Creek bridge, east of Dacre	300 00	
	Point Alexander and Bass Lake Road—to complete repairs	600 00	
	Petewawa (4th con.) Road—to construct from lots 4 to 9	500 00	
	Peterson Road—repairs west of Maynooth	500 00	
	Perrault Settlement and Sanson's Road—to complete construction of in Grattan	500 00	
	Peterson Branch Road—repairs between Brudenel and Combermere	700 00	
	Perth Road—to improve in North Crosby	800 00	
	Ross and Bromley Town Line Road—to complete work	500 00	
	Raglan Road—to construct from line between lots 10 and 11, concession 4, Raglan, to east Town Line of Carlow	500 00	
	South Algona (7th concession) Road—to construct from lot 6 to lot 13	500 00	
	South Algona (5th concession) Road—to construct from lot 26 to lot 30	500 00	
	Sturgeon Falls Road—to extend westward, from Sturgeon Falls, as may be located	1,500 00	
	Victoria Road—to repair from Uphill south, conditional upon a grant of $200 from Council	800 00	
	Westmeath Road—to construct on 9th and 10th concession line	500 00	
	Waugh Road—to complete on north side of Gull Lake	800 00	
	Wilberforce (18th con.) Road—to continue eastward to connect with main road	500 00	
	White Fish Lake Road—to construct between concessions 17 and 18 of Galway and Cavendish, from lot 20 Galway east to lot 5 Cavendish, and continue Cavendish road to Buckhorn road	500 00	
	Wellington Road—To repair bridge	500 00	
	Wicklow and McClure Townships Roads—to improve between concessions 5 and 6 of Wicklow, easterly, $250, and between cons. 10 and 11 of McClure towards Hay Lake, $250.	500 00	
	Widdifield Road—from Government road northward, between lots 20 and 21, Widdifield	800 00	
			38,000 00

COLONIZATION ROADS—*Concluded.*

No. of Vote.	SERVICE.	To be voted for 1888.	
85	*General Purposes.*		
	New short roads and repairs	20,000 00	
	Inspection	4,000 00	
	To pay balances of 1887	2,000 00	
			26,000 00

XIII.—CHARGES ON CROWN LANDS.

To be voted per Statement (A) $101,900.00

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
86	Expenditure on account of Crown Lands	96,900 00	101,900 00	5,000 00	

No. of Vote.	SERVICE.	Salaries and Expenses. 1887.	1888.
86	DETAILS.	$ cts.	$ cts.
	Board of Surveyors	400 00	400 00
	Agents' salaries, and disbursements	22,000 00	22,000 00
	Forest ranging, inspection of timber limits and fire protection	22,000 00	22,000 00
	Fire ranging	10,000 00	15,000 00
	Special timber inspection	3,000 00	3,000 00
	Note.—Half the appropriation for fire ranging and the whole of the amount taken for special timber inspection will be refunded by the licensees.		
	SURVEYS.		
	Townships in new districts	35,000 00	35,000 00
	Maps	2,000 00	2,000 00
	Survey of limits in Huron and Ottawa territory, chargeable against holders	2,500 00	2,500 00
		96,900 00	101,900 00

XIV.—REFUND ACCOUNT.

To be voted per Statement (A)..... $27,954 25

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887. Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
87	Education.....	5,000 00	3,000 00	.....	2,000 00
88	Crown Lands.....	10,500 00	16,500 00	6,000 00	
89	Municipalities' Fund.....	4,457 35	4,834 51	377 16	
90	Land Improvement Fund.....	4,040 93	3,619 74	.....	421 19
		23,998 28	27,954 25	6,377 16	2,421 19

	SERVICE.		To be voted for 1888.	
			$ cts.	$ cts.
87	EDUCATION.			
	Account of contribution to Superannuation Fund, withdrawn.....		3,000 00	
				3,000 00
88	CROWN LANDS.			
	For payments made to the credit of the Department on account of uncompleted purchases, and afterwards returned to proposed purchasers on purchases not being carried out.....		7,500 00	
	For two per cent. of timber dues, payable to municipalities for timber cut on road allowance.....		4,000 00	
	Refund to settlers under the amendment to the Free Grants' Act of 1880.		5,000 00	
				16,500 00
89	MUNICIPALITIES' FUND.			
	Amount collected in 1887.....	7,433 70		
	Less 20 per cent. commission.....	1,486 74		
	Vide Stat. Can. 18 Vic. c. 2, and 19 Vic. c. 16.	5,946 96		
	Balance at credit of Fund, January 1, 1888.....	7,556 33		
		13,503 29		
	Less Widows' Pensions for 1886, 7 & 8.....	8,668 78		
	To be added to grant to Public and Separate Schools (50 V. chap. 5).....		4,834 51	
				4,834 51
90	LAND IMPROVEMENT FUND.			
	Moneys collected from sale of Crown Lands, subject to the Land Improvement Fund, for the year ending 31st December, 1887.....	3,136 36		
	Less 4-5, leaving 1-5 to the Land Improvement Fund, *Vide* Stat. Can. 16 Vic. c. 159, and Con. Stat. Can. c..	2,509 09		
		627 27		
	Less 6 per cent. for cost of collection and management.	37 63		
			589 64	

XIV.—REFUND ACCOUNT—*Concluded.*

No. of Vote.	SERVICE.		To be voted for 1888.	
			$ cts.	$ cts.
90	LAND IMPROVEMENT FUND—*Continued.*			
	Moneys collected from the sale of Common School Lands, subject to the Land Improvement Fund, for the year ending 31st December, 1887	12,085 86		
	Less 6 per cent. for collection and management	725 15		
		11,360 71		
	To be distributed as follows:—			
	¼ to Land Improvement Fund	2,840 18	2,840 18	
	¾ to be added to Common School Fund	8,520 53		
	Moneys collected for the sale of Grammar School Lands, subject to the Land Improvement Fund, from 30th June, 1886, to 31st December, 1887	808 15		
	Less 6 per cent. for collection and management	48 49		
		759 66		
	Less ¾, leaving ¼ to the Land Improvement Fund	569 74	189 92	3,619 74
				27,954 25

XVI.—STATUTE CONSOLIDATION.

To be voted per Statement (A).....$21,500.00.

No. of Vote.	A.	1887.	1888.	Compared with Estimates of 1887.	
				Increase.	Decrease.
		$ cts.	$ cts.	$ cts.	$ cts.
91	For Consolidation of Statutes (re-vote $5,891.00)	33,650 00	18,000 00	.....	15,650 00
	Allowance to Judges	.....	3,500 00	3,500 00	.....
		33,650 00	21,500 00	3,500 00	15,650 00

XVII.—MISCELLANEOUS EXPENDITURE.

To be voted per Statement (A) $68,100.00

No. of Vote.	A.	1887.	1888.
		$ cts.	$ cts.
92	To cover expenses of collection of revenue for law stamps and licenses..	1,500 00	1,500 00
	To cover expenses *re* Canada Temperance Act.....	11,400 00	25,000 00
	Marriage licenses	400 00	400 00
	Ontario Rifle Association.....	1,000 00	1,000 00
	Ontario Artillery Association.....	500 00	500 00
	Insurance public buildings	4,500 00	.....
	Expenses, elections	70,000 00	1,800 00
	Voters' lists	2,000 00	2,000 00
	Gratuities	13,200 00	5,000 00
	For gratuity to Dr. Wallace, late Medical Superintendent of Hamilton Asylum, resigned on account of broken health	....	3,600 00
	Gratuity to L. W. Ord, late clerk in the Treasury Department, resigned on account of ill health.....	.....	1,400 00
	Gratuity to family of Thos. H. Johnson, late Assistant Commissioner of Crown Lands (*re-vote*)	4,200 00	4,200 00
	Allowance to Attendants, Hamilton Asylum, in consideration of loss of clothing, etc., at fire	.....	2,000 00
	Expenses *re* Indian and Colonial Exhibition.....	1,170 00	200 00
	In aid of archæological researches in Ontario	1,000 00	1,000 00
	Boundary litigation.....	5,000 00	2,000 00
	Telephone services.....	1,200 00	1,300 00
	Removal of patients.....	6,000 00	6,000 00
	Prisoners' Aid Society.....	1,000 00	1,000 00
	Sanitary Investigations and Health Conferences.....	1,000 00	1,000 00
	Outbreak of epidemics.....	1,500 00	1,500 00
	University College, Ladies' Department	700 00	700 00
	Grant to Vaccine Farm :—		
	One-half allowance, 1887, unpaid (*re-vote*) 250 00		
	Allowance for 1888 ..... 250 00		
		500 00	500 00
	Factories' Act :—		
	Salaries..... 3,000 00		
	Expenses 1,500 00		
		3,500 00	4,500 00
		131,270 00	68,100 00

XVIII.—UNFORESEEN AND UNPROVIDED.

To be voted per Statement (A).....$50,000.00

No. of Vote.	A.	1887.	1888.
		$ cts.	$ cts.
93	To meet unforeseen and unprovided expenses.....	50,000 00	50,000 00

SUPPLEMENTARY ESTIMATES.

CIVIL GOVERNMENT.

Government House.

Additional for Assistant Gardener and Fireman	$100 00	

Department of Agriculture.

For nine months' salary of Minister of Agriculture	3,000 00	

Registrar General's Branch.

To pay for assistance in bringing up arrears of work	650 00	
		$3,750 00

ADMINISTRATION OF JUSTICE.

New Judicial Districts	$2,000 00	
Thunder Bay District:		
To pay arrears to late Registrar	130 60	
		2,130 60

EDUCATION.

Engine for Printing office	$180 00	
School inspection, Muskoka	270 00	
		450 00

PUBLIC INSTITUTIONS MAINTENANCE.

Orillia Asylum:			
Salary of gardener	$ 400 00		
To purchase team, harness, etc	300 00		
Messenger	240 00		
		$ 940 00	
Central Prison:			
Arrears of salary to Deputy Warden Logan		1,100 00	
			2,040 00

IMMIGRATION.

To pay outstanding accounts to date	$300 00	
		300 00

AGRICULTURE.

Eastern Ontario Poultry Association	$ 300 00	
Creameries Association, additional	500 00	
Additional to Agriculture and Arts Association	5,500 00	
		6,300 00

HOSPITALS AND CHARITIES.

Grant to Hospital of Sisters of St. John the Divine	$408 90	
		408 90

MAINTENANCE AND REPAIRS OF GOVERNMENT AND DEPARTMENTAL BUILDINGS.

Osgoode Hall:		
Repairs, painting and alterations in basement	1,000 00	
		1,000 00

PUBLIC BUILDINGS.

Asylum for Insane, Toronto:		
Four cottages at the Mimico Farm, central building, boiler house, drainage, etc., to cost $100,000 (required for this year)	50,000 00	

Asylum for Insane, London:			
Capital account, drainage, re-vote	$10,000 00		
Repairs and addition to Bursar's residence	2,500 00		
Additional for re-construction of portion of main building, injured by fire	6,000 00		
Renewing laundry machinery and kitchen (Inspector)	5,200 00		
		$23,700 00	
Hamilton Asylum:			
For removal and rebuilding of stables, piggery, etc		2,000 00	
Institution for the Blind:			
To purchase land to river		750 00	
Asylum for Idiots, Orillia:			
New farm buildings (new cottages)	5,000 00		
Piano (re-vote)	450 00		
Allowance, *re* opening of new road by Municipality to new Asylum	1,000 00		
		6,450 00	
Institution for the Deaf and Dumb, Belleville:			
Repairs to workshop, etc., caused by fire		800 00	
Reformatory for Females, Toronto:			
Alteration of pipes and hose for fire protection		800 00	
Agricultural College, Guelph:			
Repairs to brick cottage on farm	400 00		
Pumps, tanks and pipes for water supply	1,000 00		
		1,400 00	
Education Department, Normal and Model Schools, Toronto:			
Alterations in Library and basement		1,000 00	
Normal School, Ottawa:			
Brick water-closet on boys' side		800 00	
Algoma District:			
Safe for Land Titles office, Sault St. Marie		150 00	
Thunder Bay District:			
Addition to lock-up, Fort William		800 00	
Nipissing District:			
Court room and gaol, North Bay		8,000 00	
Manitoulin Island:			
Court House, offices, etc		5,000 00	
			101 650 00

COLONIZATION ROADS.

Huronian Mines Road:		
To complete about five miles into the Mining District	$2,500 00	
Rabbit Mountain and Whitefish Lake Road:		
Additional sum necessary to complete and extend road	1,000 00	
Indian Peninsula Road:		
To continue construction through Townships of Lindsay and St. Edmunds towards Tobermory	750 00	
Ryde Centre Road:		
To complete	800 00	
		5,050 00

MISCELLANEOUS.

Expenses Municipal Commission	$2,500 00	
do Mining Commission	5,000 00	
Litigation of Indian claims by Dominion Goverment	5,000 00	
Gratuity to Stafford Bottom	500 00	
Industrial School, Mimico	1,000 00	
		14,000 00
		$137,079 50

To defray expenses of Legislation, Public Institutions Maintenance, and for salaries of the officers of the Government and Civil Service for the month of January, 1889 ..... $80,000 00

REPORT

OF THE

COMMISSIONER OF PUBLIC WORKS

FOR THE

PROVINCE OF ONTARIO

FOR THE

YEAR ENDING 31st DECEMBER,

1887.

Printed by Order of the Legislative Assembly.

Toronto:
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1888.

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REPORT

OF THE

COMMISSIONER OF PUBLIC WORKS

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR ENDING 31ST DECEMBER, 1887.

To His Honour SIR ALEXANDER CAMPBELL, K.C.M.G.,

Lieutenant-Governor of the Province of Ontario, etc.

As required by the provisions of the Statute in that behalf, I beg to submit the report of the works, etc., prosecuted under the control of the Public Works Department during the year 1887.

The accompanying report of the Architect, etc., of the Department will be found to contain full details of all operations in connection with the several Public Institutions and Public Buildings.

The report of the Engineer of the Department, appended hereto, furnishes like details in respect of Provincial locks, dams, slides, etc.

There will also be found in the last mentioned report a summary of the progress of railway construction throughout the Province, during the year just ended.

Statements of the Accountant and Law Clerk, showing expenditures under maintenance and capital appropriations ; contracts and bonds prepared ; and drainage debentures purchased, are appended to the report.

Very respectfully submitted.

C. F. FRASER,
Commissioner, etc.

DEPARTMENT OF PUBLIC WORKS, ONTARIO,
December 31st, 1887.

REPORT

OF

THE ARCHITECT, ETC.

Department of Public Works, Ontario,
Toronto, December 31st, 1887.

Sir,—I have the honour to submit the following report :—

GOVERNMENT HOUSE.

The usual repairs were made during the year, and the grounds have been kept in good order. Several articles of furniture and furnishings were supplied as required consequent on the changes made in the re-arrangements of the apartments. The drawing room was re-papered and painted, and some alterations were made in some of the rooms on the upper storey, which were re-papered and painted. An hydraulic elevator, with direct action, was fitted up near the side vestibule, which affords a convenient means of communication between the ground and upper storeys. The old board fence surrounding the grounds, some portions of which were constructed more than fifty years, being out of repair and decayed in several places, was taken down, and a wrought iron fence, with cedar posts, was constructed, the materials of which were supplied by contract, and the work done by carpenters and labourers under the superintendence of the Permanent Clerk of Works.

NEW PROVINCIAL PARLIAMENT BUILDINGS.

The works in connection with the erection of these buildings were resumed early in the season, under the directions of R. A. Waite, Esq., Architect, and the walls of the basement have been built to the ground floor line, with the exception of the plinth course on the outside walls of the building.

PARLIAMENT AND DEPARTMENTAL BUILDINGS.

The ordinary repairs to the buildings were made where required, and furniture, etc., supplied to the several offices in compliance with requisitions. The roadways, plank walks and grounds have been kept in good order. Owing to the increase of the business of the Departments an additional building, No. 138 Wellington Street, was rented and is now occupied by the Public Works Department and Inspectors of Factories. The vacated rooms in the rented premises on Simcoe Street, will be occupied by the Registrar General's Branch of the Provincial Secretary's Department, and the Inspector of Division Courts. These changes will afford more accommodation for the Provincial Secretary's Department, and Provincial Auditor, in the east wing of the Parliament Buildings. The rented premises have been fitted up in a suitable manner to meet the requirements of the public service.

ASYLUM FOR THE INSANE, TORONTO.

The mansard roofs of the eastern and western gate lodges were completed early in the season. A new kitchen, eighty feet by thirty-four feet, and a bakery, sixty-four feet by twenty-two feet, two storeys in height with a basement under the kitchen, was built on the east side of the laundry building, by asylum and central prison labour, the materials having been supplied by this Department. The building has been completed, but is not yet occupied. The plans were prepared in the Department, and an occasional inspection was made during the progress of the work, which was done under the superintendence of a central prison guard.

ASYLUM FOR THE INSANE, LONDON.

New tile drains were constructed from the basements of the eastern and western cottages to the outlet drain on the side road west of the grounds. A fire occurred on the second of December, in the drying room of the main asylum building, which destroyed the roof and upper floor, the walls being so much injured that the greater portion of them have been taken down, and the remainder will have to be removed to the foundations before a new building can be erected during next season. The Permanent Clerk of Works went to London on the 3rd of December, to make temporary arrangements for cooking and washing, and to ascertain the damage in order that the insurance companies could be notified. The east workshop has been fitted up as a laundry, with a drying room on the second storey, and the eastern portion of the east coal shed has been partitioned off for the washing machines and engine, these buildings being connected by a short passage. The old kitchen has been roofed in temporarily, and the flagged floor being uninjured can be used until new buildings are erected next season, for which an appropriation will be required. The fittings and furnishings of the laundry and drying room, which are being constructed under the directions of the Inspector of Prisons, etc., will soon be completed and in full operation.

ASYLUM FOR THE INSANE, HAMILTON.

The work connected with the construction of the south cottage was continued during the year, the west wing being now ready for occupation.

The centre building was commenced early in the season, and the contractors were notified that this building would be required when the west wing was completed, but owing to some delays which the contractors urged were unavoidable, the work will not be completed for about a fortnight.

The brickwork of the east wing was continued during the summer, and this portion of the building was roofed in and enclosed early this month.

The main steam-heating pipes were also extended to this wing so as to enable the carpenters and plasterers to continue the work during the winter.

The steam-heating apparatus of the west wing and centre building was completed and fully tested during this month. Some additional radiators will be required.

The re-construction of the rear addition of the main building, containing the kitchen, laundry, drying, dining rooms and amusement hall, was continued during last winter, and the whole completed and occupied in the early part of the year.

A new tile drain, twelve inches in diameter, had to be constructed to convey the surface water from eastern portion of the site of the south cottage to the branch drain leading to the main sewer.

A tile drain, six inches in diameter, was also constructed on the north side of the pumping engine house, on Queen Street, to convey the water from the down and waste pipes to the Queen Street Sewer.

The pumping engines and boilers on Queen Street, which supply the water from the city water works to the asylum buildings, are in good order, but as the construction of the south cottage will add three hundred patients more to this asylum, making it as large as

the London asylum, it will be necessary to increase the pumping power, and construct a larger main from the engine house to the tanks on the asylum grounds, unless water should be found by boring on the site, which is now in progress under the Inspector of Prisons, etc.

ASYLUM FOR THE INSANE, KINGSTON.

A new tin roof was constructed over the boiler house, and sundry repairs made to protect the boilers and steam pipes from injury.

The outside woodwork of the main building was painted early in the season, and the cut stone and mason work of the chimneys and walls were pointed under the directions of the Permanent Clerk of Works.

The pointing of the walls and repairs to the stone work will have to be continued during the next season as the work has not been fully completed.

BRANCH ASYLUM, KINGSTON.

The plastering of some of the ceilings and partitions was repaired.

No further repairs were required for this building.

ASYLUM FOR IDIOTS, ORILLIA.

The contractor commenced the work on the new cottages so soon as the weather permitted in the spring, and continued it until the north cottage was occupied by patients early in November, the kitchen and laundry having also been completed.

The work on the south cottage has now been completed and ready for occupation.

Both cottages have been connected by covered passages leading from the kitchen. The main steam heating pipes have been fitted to the brick arches over those passages in the basement, the floors being of concrete.

The pumping engines and boilers were set up and tested during the summer, the water supply having been found quite satisfactory. The reservoirs have all been fenced in so as to protect them from pollution. The gas works were also completed and fully tested.

The main sewer was extended to the lake, one hundred feet from the shore, the tile pipes, fifteen inches in diameter, having been protected by logs and covered with loose stone work.

There has been no expenditure for repairs at the main Asylum.

REFORMATORY FOR BOYS, PENETANGUISHENE.

The plans and specifications for the new stable, etc., were prepared and forwarded to the superintendent; the levelling of the ground and stone work of foundations having been done with the assistance of the boys.

Tenders for the construction of the superstructure were received by the superintendent, that of Mr. R. Burdett, Collingwood, $3,040, being the lowest was accepted. The work was done in a satisfactory manner and fully completed.

ANDREW MERCER REFORMATORY FOR FEMALES.

The return pipes of the hot-water heating apparatus in the basement of the centre building and east wing, where rusted by contact with the concrete, were taken up and replaced with new pipes.

The new pipes were protected by brickwork and pine boxes in order to prevent further injury from the lime and moisture.

The return pipes in the west wing will have to be replaced next year.

CENTRAL PRISON, TORONTO.

There has been no expenditure on account of general repairs, except for some lumber required for alterations in connection with the new cells, the work having been done by prison labour.

DEAF AND DUMB INSTITUTE, BELLEVILLE.

An addition was built of brick to the entrance lodge, tenders having been received for the same, and for a drain from the cellar of the bursar's house. The lowest, $629, being that of Thomas Luscombe, was accepted. The work was done in a satisfactory manner according to contract.

Fire-escapes, consisting of wrought iron balconies and steps, according to a plan which has been patented, were constructed at each end of the main building, a contract having been entered into with the patentee for their construction, for the amount of the appropriation. The work was fully tested when completed and found to be satisfactory in every respect.

BLIND INSTITUTE, BRANTFORD.

Plans and specifications were prepared for the construction of new roofs over the deck roofs of the main building, and the work was done in a satisfactory manner by Brown Bros., of Brantford, according to tender, $1,364, including repairs to slating.

AGRICULTURAL COLLEGE, GUELPH.

The new barn and farm buildings, which required some further improvements and alterations, were placed in good order by the contractor, Mr. Schwendiman, and these buildings are now in a satisfactory condition.

Plans and specifications for the new chemical laboratory were prepared in the early part of the season, and tenders were received for its construction, that of Mr. J. W. Schwendiman, $6,960, and for alterations in the college building $185, being the lowest, were accepted.

As it was decided to have the laboratory heated by a hot-water apparatus, tenders were received for the same, the lowest, $850, being that of the Stove and Furnace Co., of Peterboro', was accepted It has been fully tested and found satisfactory.

The furniture for the laboratory was provided by Burr Bros., Guelph, as per tender, $515.

The fittings for water and gas were placed in the building by the engineer of the college, Mr. Angell, the iron pipes and other materials having been provided under the directions of the president.

The work connected with the new chemical laboratory was done in a satisfactory msnner by the contractors under the superintendence of Mr. Robert Chisholm, Clerk of the Works

The alterations in the museum will soon be completed, the work in the main building having been done during the summer so as to be completed before the close of the vacation.

The chemical laboratory has been built on the site of the old farm buildings, south-east of the main building about one hundred feet distant, the front line corresponding with the college building.

The practical laboratory is fifty feet by twenty-one feet, class-room thirty-five by thirty-one, private laboratory twenty-one by twelve, apparatus-room twelve by nine, balance-room nine by six, office twelve by nine, and hall six feet wide, the height throughout being sixteen feet. The basement, eight feet in height, is used for store rooms, heating apparatus, and coal vaults.

EDUCATIONAL DEPARTMENT AND NORMAL SCHOOL, TORONTO.

The ordinary repairs to the buildings and drains were made as required, and some painting was done.

The steam-heating pipes were altered, and some radiators placed in the normal school building, to increase the temperature in some of the rooms which were not satisfactory in this respect. The alterations have been found beneficial, and the steam-heating of these buildings is now in a satisfactory condition.

Plans and specifications were prepared for the construction of new slate roofs and alterations in the model schools, on which tenders were received, but owing to the strikes among the workmen the amounts of the tenders were much beyond the appropriation, and the work in consequence had to be deferred.

NORMAL SCHOOL, OTTAWA.

The usual repairs and painting required for the buildings were attended to during the vacation, and the furnaces and steam-heating apparatus placed in good order.

The roofs were also repaired and the boys' shed painted. Some furniture and furnishings were provided as required.

SCHOOL OF PRACTICAL SCIENCE.

The furnaces were repaired and put in good order and the ordinary repairs were attended to as required.

On the 13th of December it was reported that some cases of typhoid fever had occurred amongst the students in engineering, which was attributed to the defective plumbing of the water-closets. On examination and enquiry it was ascertained that the water meter, which was placed on the one inch water supply pipe by the City water works, became choked with sediment, and was replaced by another meter on the 11th of November. The water passing through such sediment must have been impure, and as the students were in the habit of drinking it, will, in my opinion, account for the illness which occurred.

The closets which were constructed on the old pan system when the building was erected, nine years since, have been taken down and new closets are now in course of construction, with ventilating pipes, traps and urinals of the latest improved description.

A water supply pipe two inches in diameter has been recently laid by the City water works, and an improved water meter has been placed inside the building so as to be easily examined, in order to prevent the recurrence of an impure water supply for the future.

OSGOODE HALL, TORONTO.

The roofs were repaired where necessary and some painting to preserve the cut stone work was required during the year.

An additional room was required for the use of the Judges in the Chancery Division, and as all the rooms were occupied it was decided to construct a brick addition in the north-west angle of the court yard. A plan and specification having been prepared it was built by Mr. John Herbert according to tender for $600, the carpenter work having been done by the Department. The room as provided has been fitted up as a library and the room on the ground floor has not yet been occupied.

ALGOMA DISTRICT.

Appropriations having been made for the construction of lock-ups at Bruce Mines and Thessalon, plans and specifications were prepared and arrangements made to proceed with the works on the opening of navigation. Mr. Munro, Clerk of Works at Huntsville, was accordingly instructed to go to Bruce Mines and Thessalon in order to purchase materials and employ workmen to construct the lock-ups, as the experience of last year

proved that tenders could not be procured from contractors in these localities. The lock-ups were constructed during the season and were ready for occupation in the autumn, furniture and stoves having been provided.

These lock-ups were constructed of logs ; the lock-up at Bruce Mines being thirty feet by twenty-one feet, containing three cells for males and two for females, day rooms, also two keepers' rooms. The lock-up at Thessalon is twenty feet square, containing four cells and a day room. Yards, enclosed by a board fence twelve feet in height, were constructed round each lock-up, with woodsheds and conveniences in each yard.

Alterations had to be made in the gaol at Sault Ste. Marie, the rooms in the basement having been fitted up for drunks and disorderlies as recommended by the Inspector of prisons, etc. A kitchen was also constructed for the gaoler as an addition to the residence previously built.

Some repairs were required to the lock-up at Gore Bay, which were done under Mr. Munro's superintendence.

A tile drain nine inches in diameter was constructed from the yard of the gaol at Port Arthur, to the low ground in front of the court house, and a stone cesspool with an overflow was built on the side of the hill for the reception of the sewage. The work was done under the directions of the acting sheriff and gaoler, the labour of the prisoners being employed.

Some repairs were made to the lock-up at Fort William, under the directions of the keeper.

MUSKOKA DISTRICT.

Trifling repairs were required and made to the registry office at Bracebridge, and the lock-up at Huntsville.

PARRY SOUND DISTRICT.

The Court room and lock-up at Burk s Falls were completed early in April and have been occupied since that time.

Repairs were made to the fence round the lock-up at Parry Sound, and to the Court room and registry office.

NIPISSING DISTRICT.

The registry office at North Bay was completed and occupied.

Some repairs were made to the lock-ups at Mattawa and Sudbury, and new furniture provided for the latter.

RAINY RIVER DISTRICT.

A Gaoler's residence at Rat Portage has been erected.

Of the tenders for its construction, that of Messrs. Gerrie and Sterling for $1,150, being the lowest was accepted, and the work was done by them under Sheriff McQuarrie's directions.

MISCELLANEOUS.

There has been no expenditure on account of the registry office and court room at Minden, Provisional County of Haliburton, repairs not being required.

No expenditure was required for the fence along the river bank at Niagara Falls, as it is now under the control of the Commissioners for the new Provincial Park.

The shed in the rear of the caretaker's residence at Brock's Monument required repair, and the work was done by Mr. George Kirkland, Queenston, according to tender for $175, some repairs were also required to the stone work of the monument which were done in a satisfactory manner.

I have the honour to remain,
Your obedient servant.

KIVAS TULLY,
Architect, etc.

Hon. C. F. Fraser,
Commissioner of Public Works,
Ontario.

REPORT

OF THE

ENGINEER OF PUBLIC WORKS.

Department of Public Works, Ontario,
Toronto, 31st December, 1887.

Hon. C. F. Fraser, *Commissioner of Public Works, Ontario* :—

Sir,—I have the honour to submit the following report on the works which have been attended to by the Department, also the extension of railways throughout the Province, during the year 1887.

GULL AND BURNT RIVER WORKS.

A glance pier has been built on the easterly side of the river, immediately below the dam and slide at the outlet of Hawk Lake, in the Township of Stanhope, to facilitate the passage of timber down the stream. The pier is 60 feet in length and 5 feet 6 inches in height, constructed of round timber.

A re-vote of the unexpended balance of the appropriation granted to meet one-half of the cost of re-constructing the dam across the Burnt River, at Kinmount, was taken last Session.

The work was commenced in 1886, and at the close of that year was well advanced. Operations were continued during the present year, until the early part of September, when, upon examination being made, it was found satisfactorily completed.

The dam is about 200 feet in length, 30 feet in width, and 13 feet in height, constructed of square timber with openings formed in same, and supplied with stop-logs and the necessary appliances for raising and lowering them, so as to enable the water to be regulated and utilized to the best advantage, It is a strong, substantial structure and will fully meet the requirements of the public in that locality.

MUSKOKA LAKES WORKS.

After the destruction of the steamer Nipissing by fire, in the latter part of the season of 1886, the Muskoka and Nipissing Navigation Company decided on replacing her with as large a boat as possible, so as to afford better accommodation and meet the rapidly increasing requirements of the public. In order to enable this to be accompliished to the fullest extent an alteration was made, in the early part of the present year, to the lock at Port Carling, by means of which the length of the chamber was increased several feet.

The work consisted of cutting away a portion of the upper main sill and mitre-sill platform and making other provision for the requisite strength, coffer-dams having to be put in and the lock unwatered to enable the improvement to be carried out.

Several minor alterations and repairs were also made to the lock-gates and swing-bridge. Operations were commenced in the early part of March and continued until the latter part of April, when the work was completed, navigation having in no way been interfered with.

The bridge, which aforded a means of crossing the cut which connects Lakes Joseph Rosseau, at Port Sandfield, having become in a decayed and unsafe condition, has been taken down and replaced with a swing-bridge, which it is expected will meet the requirements of the public in a more satisfactory manner than the old structure, as the long trestle approaches and heavy grades at each end, which were frequently complained of by persons having occasion to use it, are now done away with.

The new bridge has been erected on the "Howe Truss" principle provided with iron suspension rods, in which provision has been made for adjusting the structure. It is 12 feet 4 inches in width between the chords, has a total length of 111 feet, and when open leaves the cut, which is about 60 feet in width, unobstructed.

The cribwork piers, upon which the bridge rests, are built upon the cribbing which forms the sides of the cut, the centre pier being 16 feet square and 15 feet in height, and the pier at the toe of the bridge 10 feet in width, 20 feet in length, and 6 feet in height, with a framed bent on top extending to the under side of the trussing.

The heel or easterly end of the bridge also rests upon a cribwork pier 8 feet in width, 16 feet in length, and about 7 feet in height.

The approach at the west end, about 40 feet in length, is supported on framed bents placed about 20 feet apart with 12x12 inch stringers and corbels on top.

The flooring throughout is 3 inches in thickness, and where required a substantial hand-railing has been provided.

The floor of the bridge has been kept as nearly as possible on a level with the surface of the roadway on each side of the cut; which leaves sufficient height between the bottom timbers of the structure and the water to enable the majority of vessels navigating these lakes to pass without being in any way interfered with.

Provision was also made in the estimates of the present year for the entire re-construction of the bridge across the southerly outlet of Lake Muskoka, at Bala, but upon further examination being made it was ascertained that, although requiring considerable repairs, the piers and approaches of the old bridge could be utilized with advantage for the new structure.

The piers are constructed of dry stone rubble masonry, pointed-up on the outside with cement mortar, one of them having a cut-water covered with 6 inch oak planking put on vertically.

This sheeting was removed, the pier re-pointed with mortar, and new sheeting put on, which was scribed to the rock and bedded in cement so as to prevent the water from percolating through the stonework.

The piers have also been raised with cribwork a height of 3 feet in order to suit the new truss, which, although having the same clear span of 70 feet as the old one, is differently constructed.

The necessary repairs have also been made to the approaches, all decayed and unsuitable timber having been removed and replaced with proper material, and the approach at the western end entirely re-floored with 3 inch planking.

The dam has been supplied with some new windlasses, the stop-log platform replanked and repairs made to the piers above which support the boom.

Some of the planking in the stop-log openings of the dam across the northerly outlet of the lake has also been renewed, and other minor repairs made to the structure.

The works in this locality are now, therefore, in a good state of repair.

MARY'S AND FAIRY LAKES WORKS.

The piers which form the sides of the slide opening in the lower dam at Port Sidney, and also three which afford support to the guide booms above, have been increased one foot in height, it having been found during the freshet of the present year that the original height was insufficient. Two new piers, 14 feet in length, 8 feet in width and 10 feet in height, have also been constructed to afford additional support to the boom.

An enbankment, about 100 feet in length and extending across the low lying ground adjoining the northerly end of the dam, to the high bank, has been formed to prevent the escape of water in this direction.

Guide booms, 350 and 150 feet in length, each, respectively, constructed of three pieces of timber bolted together, and extending from each side of the slide-opening up stream to the banks of the river, were placed in position in the early part of the present year, but shortly afterwards one of them was broken by a jam of saw-logs and about 130 feet of it carried over the dam and a considerable distance down the stream. It was ascertained that serious obstacles would have to be overcome in order to replace it, and as the cost would, in all likelyhood, exceed the value of the boom, the damage was made good with new timber.

The upper dam has been supplied with a new stop-log sill, and repairs made to the flooring of the slide-opening.

PENINSULA CREEK IMPROVEMENT.

The construction of a highway bridge to replace the structure which, as previously reported, had to be removed in 1886, owing to interference with the passage of the dredge, was commenced on the 14th of March and the work continued until its completion.

The bridge has a total length of about 200 feet, consisting of trestlework in spans of about 20 feet, and two spans, built on the "Queen Truss" principle, 40 and 44 feet in length respectively, the whole resting upon framed bents constructed on top of cribwork piers. It is a strong, substantial structure, and has been kept a sufficient height above the water to enable vessels to pass without any interference whatever, and as the flooring is nearly on a level with the adjoining roadway it is considerably improved, as the somewhat heavy grades which were at each end of the bridge are now done away with.

Three scows, 13 feet in width and 45 feet in length each, have also been constructed, upon which a large portion of the excavated material, which for various reasons could not be deposited by the dredge on the banks adjoining the cutting, is removed and disposed of in suitable positions in the adjoining lakes.

Dredging operations were resumed about the 5th of April and continued, at the northerly end of the cutting, until the latter part of October, when the channel had been completed for a length of 2,300 feet southward from Peninsula Lake, but as the weather had then become too severe for the men on the scows the dredge was moved down the cutting made in 1886, a distance of 1,100 feet, and operations resumed in the marsh where the material could be disposed of along the sides of the cut. The work was continued until the 3rd of December, when Fairy Lake was reached and operations suspended for the winter.

A re-vote therefore of the unexpended balance will require to be again taken, and an additional appropriation granted, in order to enable this work to be continued and completed during the coming year.

BALSAM RIVER WORKS.

The works which have been attended to out of this appropriation are as follows:—

The piers, 43 feet in length and 14 feet in width, which form the sides of the slide opening in the dam at Rosedale have been rebuilt from low-water up a height of 8 feet, and the floor sills and flooring of the slide, which is about 36 feet in width, has been renewed, and new stop-logs, platform and windlasses provided.

Repairs have also been made to the guide booms, and the back of the dam re-planked for a length of about 230 feet.

Provision was made in the estimates of the present year for the re-construction of the lock from low-water up, but as the lumbering season was far advanced when the appropriation was granted it was anticipated that there would be difficulty in procuring the required quantity of timber at a reasonable rate, consequently it was decided to allow the work to stand during the past summer and arrange for the timber in the latter part of the season, when, in all likelihood, more satisfactory terms could be obtained.

Temporary repairs were therefore made in order to keep navigation open, and in the latter part of November tenders were invited, by public advertisement, for the supply and delivery of the quantity of timber required, which resulted in the contract being awarded to Mr. Adam Hastings, of Norland, his being the lowest tender.

Owing to the extreme low water the latter part of the past season was very favourable for the prosecution of this description of work, and in order to take advantage of it the construction of the necessary coffer dams, above and below the lock, was commenced in the early part of November. The work is now completed, and in addition the old decayed timber has also been removed from the lock chamber and wing-walls, so that rebuilding can be commenced immediately the timber is delivered.

A re-vote of the unexpended balance of the appropriation will therefore require to be taken in respect to this work.

MAGANETAWAN WORKS.

Two piers about 10 feet in width, 20 feet in length and 8 feet in height have been constructed at the head of the channel above the lock to indicate its exact position and prevent the steamers from being injured by striking on sharp points of the rock which forms the sides of the cutting.

Six piers have also been constructed along the sides of the channel below the lock, four of them being 10 feet in width, 16 feet in length, and about 12 feet in height, and the remaining two 7 feet in width, 14 feet in length and about 7 feet in height The piers are placed 24 feet apart and have a heavy guard-timber extending from one to the other.

A boom constructed of three pieces of 12x12 inch timber strongly bolted together, and extending from the pier at the upper end of the channel to the lock-wall, a distance of 138 feet, has been provided and placed in position to serve as a guide to the steamers when entering or leaving the lock and prevent them from being forced out of the channel during boisterous weather.

Some large boulders which interfered with navigation have been blasted and removed out of the channel immediately above the swing-bridge, and some similar obstructions have been removed from the channel in Se-se-be Lake, near "Popes Point" which is situated about one mile above the lock.

In the early part of the present year considerable inconvenience was experienced in working the lock, owing to heavy leakage between the lower timbers of the walls and the rock which forms the bottom of the chamber. In order to prevent this, concrete has been placed, by a diver, alongside the walls around the entire chamber, and, although the leakage has not been entirely stopped, the difficulty formerly experienced in working the gates has been considerably lessened.

Boxes have also been constructed on the ends of the balance beams and filled with stone, which further facilitates the working of the gates, and all projecting ironwork on them, such as bolt-heads, etc., has been covered with oak-plank, so as to prevent the steamers from being injured.

The centre stop-log opening in the dam, which enables the water of Ah-Mic Lake to be regulated, has been replanked, and a sluice-way constructed so as to form an additional outlet for the water in time of freshet. Repairs have also been made to the windlasses and three new stop-logs provided.

A dam has been constructed at the outlet of Deer Lake, to facilitate the passage of timber and saw-logs down the Maganetewan River, between this lake and Georgian Bay. It is about 113 feet in length, 25 feet in width, and 15 feet in height, with two stop-log openings in same, 29 feet in width and 9 feet in depth each, and stop-log platform 89 feet in length, resting upon cribwork piers 4 feet in width and 6 feet in height.

The area of the lake is about 7 square miles, and as the dam will reserve the water at a height of about 10 feet above low water level of the present year, it is expected the supply will be adequate to meet the requirements of the lumbermen, and that the difficulty which they have frequently experienced, in getting their timber and logs down this

portion of the stream, will be overcome without drawing from Ah-Mic Lake, from which, at times, assistance could not be given without interfering with the interest of navigation.

Some cribwork piers yet require to be constructed at a short distance below the dam, and an appropriation will be required for that purpose.

NATION RIVER WORKS.

The improvement of this stream above Chesterville, which was commenced during the summer of 1885, has been continued during the present year.

As stated in my report for 1886, operations were suspended on the 7th of December of that year and were not again resumed until the 27th of May last, after which the work was pushed as rapidly as possible until about the 20th of December, when the excavation in the main stream, west of the dam at Chesterville, was completed, and operations for the present year brought to a close. The work yet to be attended to is situated in the branch where, I understand, some 2,648 cubic yards of material requires to be removed.

An examination was made on the 15th and 16th of November by a Departmental Engineer, and it being ascertained that the quantity of material then excavated amounted to fully 86,000 cubic yards, on account of which the Engineer in charge had allowed the Contractor the sum of $23,186.57, the $3,000.00 which was revoted last Session, as the balance of the aid to be given towards this work by the Province, was paid over.

I am informed that the excavation to date amounts to 94,619 cubic yards, on account of which the Contractors have been paid $23,829.17.

MAINTENANCE LOCKS, DAMS AND SWING BRIDGES.

During the past exceptionally dry season, bush fires have been very prevalent in the woods of the entire back country, and, although only one dam has been injured to such an extent as to require re-building, several have been damaged, and certainly would have been entirely consumed had not timely aid been given, and the fires suppressed by residents or persons who happened to be in the localities.

The repairs and improvements, which have been attended to out of this appropriation, are as follows:—

Horseshoe Lake Dam.

The stop-log platform of this dam, 113 feet in length, has been re-planked, two new windlasses and frames, and two new stop-logs provided. Some of the old stop-logs have also been refitted, and new steps constructed to the platform.

Kenesis Lake Dam.

This dam has been supplied with four new stop-logs, and thoroughly gravelled.

Paint Lake Dam.

A portion of the plank covering and part of the stop-log platform of this dam was destroyed by fire, but the damage has since been made good.

Crab and Hawk Lake Dams.

Repairs have been made to the stop-log platforms and stop-logs belonging to the dams at the outlets of the above mentioned lakes. The apron below the latter has also been repaired.

Dam and Slide at Workmans' Mill.

The stop-log platform of this dam, 72 feet in length, has been re-planked, and repairs made to the piers and sides of the slide. Some of the floor-planking has also been renewed.

Ball's Lake Dam.

This dam has been supplied with three new stop-logs, the windlasses and platform repaired, and some additional stone-filling put in the piers.

Elliott's Falls—Dam and Slide.

The guide booms above this dam have been repaired, and the dam supplied with three new stop-logs, but further repairs are required owing to damage sustained by fire.

Norland Dam.

Temporary repairs have been made to the guide boom above this dam, which now requires to be renewed, and the pier to which it is attached also requires to be re-built from low-water up. The dam has been supplied with three new stop-logs.

Grace Lake Dam..

This dam has been supplied with three new stop-logs, gravelled to make it water-tight, and the windlass frames repaired.

Otter Lake Dam.

This dam, situated in the Township of Monmouth, was so severely damaged by fire during the past summer, that it was decided, as the better plan, to rebuild entirely instead of repairing the old structure, and, as a shorter dam and better foundation could be obtained about 300 yards farther down stream, it was also decided to change the site.

Operations were commenced in the month of November, and the work is now well advanced, and will be completed in the early part of the coming year.

The new dam will be 87 feet in length, 20 feet in width, and 14 feet in height at the centre, with slide opening 10 feet in width and 6 feet in depth, and stop-log platform 25 feet in length. The lower portion of the structure is built of round timber for a height of 10 feet, sheeted in front with 2 inch plank, the remainder will be of hewn square timber.

Swing Bridges at Lindsay.

The bridge on Lindsay street immediately below the lock has been supplied with a new cap-piece to the gallows frame, new needle beams and heel and toe pieces, and repairs made to the chords and balance box. Repairs of a minor description have been made to the bridge on Wellington street and also to the one situated a short distance south of the Town.

Young's Point Lock, etc.

Five guide piers at the head of the canal above the lock have been rebuilt, the shore pier entirely, and the remaining four from low-water up, the average height being about 5 feet.

The shore pier is 42 feet in length, 13 feet in width, and 7 feet in height, two of the others are 14 feet in width and 17 feet in length, and the remaining two are 13 feet square.

The platform extending from the shore to the end pier has also been reconstructed, the length being 225 feet and the width 6 feet.

A pair of new gates for the upper end of the lock have been constructed, and will be put in place immediately before the opening of navigation next year, and some slight

repairs have been made to the swing-bridge, but the latter will require to be extensively repaired, and the masonry of the lock re-pointed with cement in the early part of the coming year.

Mary's and Fairy Lakes Lock.

In the early part of the present year, navigation in this locality was interfered with, for a short time, in consequence of a quantity of sand, gravel, bark and other debris having, during the spring freshet, found its way into the lock chamber and accumulated in the recesses to such an extent that the gates could not be worked. The obstructions were removed as soon as possible, the Departmental diving apparatus being utilized for the purpose.

A new set of stop-logs have been provided for the canal above the lock, and the dam has been supplied with 5 new stop-logs and two windlasses. Some slight repairs have also been made to the bridge.

The following are the lockmaster's returns of the lockages made at the different locks during the present year:—

Port Carling Lock—1,437 steamers, 189 small boats, 283 scows and 317 cribs of timber.

Mary's and Fairy Lakes Lock—42 steamers and 2 scows.

Maganetewan Lock—511 steamers, 2 scows and 16 cribs of timber.

Balsam River Lock—108 steamers, 5 small boats, 30 scows, 28 cribs of timber and 490,000 saw-logs, etc.

Lindsay Lock—141 steamers, 161 scows and 114 cribs of timber.

Young's Point Lock—686 steamers, 208 scows and 133 cribs of timber.

LAKE SCUGOG—DREDGING AT PORT PERRY.

Complaint having been made to the Department that navigation was seriously interfered with during the latter part of each season owing to insufficient depth of water at Port Perry, an appropriation of $1,000 was granted last Session to enable dredging to be proceeded with during the present year.

Upon examination being made it was ascertained that the improvement was required alongside the docks, where the lake had gradually filled up with decayed vegetable matter, sunken logs and other debris to such an extent that it was almost impossible for vessels to reach them during the season of low water.

As the Department had no plant in this locality for the prosecution of this description of work an arrangement was made with Mr. Alexander Ross, of Lindsay, to supply a dredge, two scows and four men, the additional assistance required being supplied by the Department, and a competent foreman being placed in charge of the whole.

Dredging was commenced on the 20th of September and continued until the 21st of October, when a depth of about 5 feet, at extreme low water, had been provided for a length of 516 feet along the face of the docks, the quantity of material removed being 4,160 cubic yards.

GEORGIAN BAY WORKS.

An appropriation of $500 was granted last Session for service on the further improvement of the inner channel of the Georgian Bay.

The work consisted entirely of sub-marine rock excavation, and the removal of stones and boulders from the narrows situated about seven miles below Parry Sound.

Operations were commenced in the latter part of May and continued until the width of channel had been increased to about 50 feet, the work being brought to a close in the latter part of June.

EXTENSION OF RAILWAYS IN 1887.

The following are, as far as could be ascertained, the details of work done during the present year on the different lines of railway under construction.

Ontario and Quebec Railway.

As previously reported, the extension of this railway from Smith's Falls to Montreal, was commenced in the latter part of May, 1886, and at the close of that year the work was well advanced.

Operations were continued during the present year, until the month of August, when the portion of the line within the Province of Ontario, about 82¼ miles in length, was completed and opened for traffic.

West Ontario Pacific Railway.

This railway at present extends from Woodstock to London, and forms a portion of the Canadian Pacific system.

Its construction was commenced during the month of September, 1886, and the work so vigorously prosecuted that the entire distance of about 27 miles was opened for traffic on the 16th of May last, but I understand the line was not fully completed until about the 1st of October.

Toronto, Grey and Bruce Railway.

A branch of this railway, which is also operated by the Canadian Pacific, has been constructed during the present year, extending from Glenannan to Wingham, the distance being about 4¾ miles.

Guelph and Pacific Junction Railway.

This railway will also form a portion of the Canadian Pacific system. It will extend from a point about one mile west of Campbellville station on the C.V.R. to Guelph, a distance of about 15 miles.

The grading was commenced in August, and, I understand, is now about completed, and it is expected the entire line will be opened for traffic about the month of June next.

Irondale, Bancroft and Ottawa Railway.

At the close of 1886 construction work was well advanced on the portion of this line extending from its junction with the Victoria Railway to Irondale, a distance of about 10 miles, and, I understand, the work was continued until completion, and the line regularly operated between these points for a short time in the spring of the present year.

Owing to a contemplated change of line, the permanent station buildings at Irondale have not yet been erected, nor has construction work been proceeded with beyond this point, but the line has been permanently located to Bancroft, and it is expected operations will be resumed during the coming spring and this additional distance of about 40 miles, completed before the close of the year.

Brockville, Westport and Sault Ste. Marie Railway.

Construction work has been continued on this line during the present year, and the portion between Brockville and Westport, a distance of about 46 miles, is now about completed, and will be opened for traffic in the early part of the coming year.

With the exception of preliminary surveys, I understand nothing has been done beyond Westport, but the Company expect to arrange matters and push construction through to the Sault at an early date.

St. Catharines and Niagara Central Railway.

This railway is intended to extend from Niagara Falls to Toronto, the total length being about 75 miles and will consequently form a competing line between these points with a portion of the Great Western Division of the Grand Trunk.

Construction was commenced in July, 1886, and, I am informed, 12 miles have been graded, 7 miles of steel rails laid, and 7 miles ballasted, the line being completed from Niagara Falls to Thorold, but not yet opened for traffic. It is expected the entire line will be completed about the month of June, 1889.

Canadian Pacific Railway—Sault Ste. Marie Branch.

The extension of this branch from Algoma Mills to Sault Ste. Marie, a distance of 85½ miles, was commenced in the month of January of the present year, and construction work so vigorously prosecuted that the line was completed on the 30th of November, and will be opened for traffic on the 2nd of January, 1888.

The following revised statement to the close of 1887, gives in detail the mileage of each railway in Ontario, distinguishing between those constructed before, and after Confederation :—

REVISED STATEMENT.

No.	Name of Railway.	Terminal Points.		Completed prior to Confederation.	Completed since Confederation.	At Present under Construction or Contract.
		From.	To.	Length in Miles.	Length in Miles.	Length in Miles.
1	Grand Trunk Railway, Main Line	Eastern Province Boundary.	Point Edward	457		
2	do Buffalo & Lake Huron Branch	Fort Erie	Goderich	158		
3	do London Branch	St. Marys	London	23		
4	do Galt & Doon Branch	Galt	Berlin	7	4.5	
5	do Toronto & Nipissing Branch	Toronto	Coboconk		88	
6	do Midland Railway, Main Line	Port Hope	Midland City	65	54.53	
7	do do Peterboro' Branch	Millbrook	Lakefield	13	9	
9	do Lake Simcoe Junction	Stouffville	Jackson's Point		26.5	
8	do Whitby, Port Perry & Lindsay	Whitby	Lindsay		46.	
10	do Victoria Railway	Lindsay	Haliburton		55.81	
11	do Grand Junction Railway	Belleville	Peterborough		64.65	
12	do Belleville & North Hastings	Grand Junction Railway	Madoc		22	
13	do Toronto & Ottawa, Main Line	Peterborough	Casselman		9	173
14	do do Manilla Link.	Wick	Manilla		6.5	
15	do do Omemee Link	Omemee	Peterborough		14.	
16	do Port Dover & Lake Huron	Port Dover	Stratford		63	
17	do Stratford & Huron	Stratford	Wiarton		106.27	
18	do Georgian Bay & Wellington	Palmerston	Durham		26.	
19	Grand Trunk Railway, Great Western Div. Main Line	Suspension Bridge	Windsor	229		
20	do Toronto & Hamilton Branch	Toronto	Hamilton	39.5		
21	do Loop Line Division	Glencoe	Fort Erie		145	
22	do Sarnia Branch	Komoka	Sarnia	51		
23	do Petrolia Branch	Wyoming	Petrolia	7		
24	do Brantford Branch	Harrisburgh	Brantford	8		
25	do Brantford & Norfolk	Brantford	Tilsonburgh		35.88	
26	do Wellington, Grey & Bruce	Harrisburgh	Southampton	27	102.	
27	do do S. Extension	Palmerston	Kincardine		66.	
28	do London, Huron & Bruce	Hyde Park Junction	Wingham		69.75	
29	do London & Port Stanley	London	Port Stanley	25		
30	do Welland Railway	Port Colborne	Port Dalhousie	25		
31	Canadian Pacific Railway, Main Line	Ottawa	Western Province Boundary	57	1144	
32	do Algoma Branch	Sudbury Junction	Sault Ste. Marie		180.25	
33	do Brockville & Ottawa Railway	Brockville	Carleton Place	46		

34	Canadian Pacific Railway, St. Lawrence & Ottawa Ry. and Chaudiere Branch	Prescott	Ottawa	59.5		
35	do Ontario & Quebec Railway	Toronto Junction	Eastern Province Boundary.	12.	281.25	
36	do Credit Valley Ry., Main Line	Toronto	St. Thomas		119.13	
37	do do Orangeville Branch	Streetsville	Elora and Orangeville		62.83	
38	do do Guelph do	Campbellville	Guelph			15
39	do Toronto, Grey & Bruce, Main Line	Toronto	Owen Sound		122.	
40	do do Teeswater Br.	Orangeville	Teeswater		73.	
41	do do Wingham do	Glenarman	Wingham		4.75	
42	do West Ontario Pacific Railway	Woodstock	Detroit River		27	109
43	do Pr. Arthurs Landing & Kaministiqua.	Prince Arthur's Landing	Fort William		6	
44	Northern Railway, Collingwood Line	Toronto	Meaford	94	21	
45	do Muskoka Branch	Barrie	Gravenhurst		53	
46	do Hamilton & Northwestern, Main Line	Port Dover	Allandale		135.3	
47	do do Collingwood Br.	Clarksville	Collingwood		40.	
48	do North Simcoe Junction	Colwell	Penetanguishene		33.34	
49	Northern & Pacific Junction Railway	Gravenhurst	La Vause		111.5	
50	Canada Southern Railway, Main Line	Fort Erie	Amherstburgh		229.	
51	do St. Clair Branch	St. Thomas	Courtwright		62	
52	do Essex Cut-off	Essex Centre	Sandwich		15.5	
53	do Niagara Branch	Niagara	Fort Erie	30		
54	Canada Atlantic Railway	Ottawa	Eastern Province Boundary.		68.08	
55	Cobourg, Peterborough & Marmora Ry., Marmora Line.	Cobourg	Harwood	22		
56	do do Peterborough Line.	Rice Lake	Chemong Lake		9	13
57	Kingston & Pembroke Railway	Kingston	Renfrew		103.	
58	Prince Edward County	Picton	Trenton at G. T. R.		32.44	
59	Central Ontario Railway	Trenton at G. T. R.	Coe Hill		74.	
60	Erie & Huron Railway	Rondeau	Sarnia		70.47	
61	Napanee, Tamworth & Quebec Railway	Napanee	Tamworth		30.	
62	Bay of Quinté Railway	Deseronto	Grand Trunk Railway		3.5	
63	Nosbonsing & Nipissing Railway	Lake Nipissing (S. E. Bay).	Lake Nosbonsing		5.	
64	Ontario & Sault Ste. Marie	Sault Ste. Marie	Spanish River			125
65	Irondale, Bancroft & Ottawa Railway	Kinmount	Bancroft		10.	40
66	Brockville, Westport & Sault Ste. Marie	Brockville	Sault Ste. Marie			500
67	St. Catherines & Niagara Central Railway	Niagara Falls	Toronto			75
				1455.00	4140.73	1050.00

From the foregoing details it will be seen that the total length of railways completed and opened for traffic during the present year is 209½ miles, in addition to which 8¾ miles of double track has been laid on the Grand Trunk between Lansdowne and Gananoque, and 3½ miles between Scarboro' and York.

I have the honour to remain, Sir,
Your obedient servant,

ROBT. McCALLUM,
Engineer, Public Works.

STATEMENTS

OF

THE ACCOUNTANT

AND

LAW CLERK.

No. 1.—Expenditure for Fuel, Gas, and Water, and for Repairs and Furniture and Furnishings, etc., during 1887 (from Maintenance Accounts).

NAME OF SERVICE.	Fuel, Gas and Water.	Repairs to Buildings and Works, Furnishings, Rent, etc.	Total.
	$ c.	$ c.	$ c.
Government House	2,392 13	6,984 82	9,376 95
Parliament Buildings, Main Building	3,079 13	7,330 43	10,409 56
" " West Wing (C. L. Dep't)	1,999 58	781 13	2,780 71
" " East Wing	1,427 51	1,517 37	2,944 88
Rented Premises, Simcoe Street, (Attorney-General's and Public Works Departments)	620 92	2,491 64	3,112 56
Education Department and Normal and Model Schools, Toronto	3,796 31	3,228 21	7,024 52
Normal and Model Schools, Ottawa	1,912 41	1,016 72	2,929 13
Agricultural College, Guelph	4,358 44	924 28	5,282 72
School of Practical Science, Toronto	822 02	691 16	1,513 18
Osgoode Hall, Toronto	4,762 65	1,843 08	6,605 73
Agricultural Hall, Toronto	315 25	26 60	341 85
Maintenance of Locks, Dams, Slides, etc		5,110 84	5,110 84
Lockmasters, Bridge-tenders, etc (Salaries)		2,486 73	2,486 73
Superintendent of Locks, Dams, etc (Salary)		1,200 00	1,200 00
General Clerk of Works and Repairs, for Public Institutions (Salary)		1,200 00	1,200 00
Carpenter (engaged on Government Buildings generally) (Salary)		720 00	720 00
Plumber (engaged on Government Buildings generally)—including Dec. '86 (Salary)		919 75	919 75
Assistant do do (Salary)		221 00	221 00
Totals	25,486 35	38,693 76	64,180 11

J. P. EDWARDS,
Accountant, P. W.

Department of Public Works, Ontario,
Toronto, *January*, 1888.

No. 2.—Statement of the Expenditure on Public Buildings and Works in 1887, and Total Expenditures up to the 31st December, 1887.—(Capital Account.)

NAME OF WORK.	Expenditures from 1st July, 1867, to 31st Dec., 1885.	Expenditure, 1886.	Expenditure, 1887.	Totals.
	$ c.	$ c.	$ c.	$ c.
Government House	160,108 92	1,276 63	3,479 04	164,864 59
Parliament and Departmental Buildings	85,285 98			85,285 98
New Parliament Buildings, Queen's Park (to Lionel Yorke, Contractor)		6,000 00	147,060 44	179,443 33
do do (sundry payments to Architect and others)	7,903 66	861 38	17,617 85	
Asylum for the Insane, Toronto	261,397 99	6,141 90	7,112 05	274,651 94
" " London	643,821 36	5,233 03	5,520 60	654,574 99
" " Hamilton	416,082 32	53,662 28	88,875 11	558,619 71
" " Kingston	279,416 22	14,617 76	16,880 48	310,914 46
" (Branch) " "		9,299 94	67 00	9,366 94
Asylum for Idiots, Orillia	65,681 10	65,033 21	56,580 60	187,294 91
Deaf and Dumb Institute, Belleville	212,451 71	5,659 69	3,897 78	222,009 18
Blind Institute, Brantford	218,856 72	3,578 31	5,732 67	228,167 70
Reformatory for Boys, Penetanguishene	114,397 73	5,871 53	6,645 61	126,914 87
Central Prison, Toronto	593,916 19	9,130 54	6,939 15	609,985 88
Agricultural College, Guelph	273,067 44	22,462 99	12,999 56	308,529 99
School of Practical Science, Toronto (old building)	59,100 26			59,100 26
" " " (new building)	51,651 47	497 10	1,362 07	53,510 64
Andrew Mercer Reformatory for Females, Toronto	107,708 94			107,708 94
" " " "	39,531 87	1,963 73	2,943 05	44,438 65
Normal and Model Schools, Toronto	72,476 29	1,909 61	54 00	74,439 90
" " Ottawa	145,250 25	1,416 84	3,056 35	149,723 44
Government Farm, Mimico	51,646 34			51,646 34
Osgoode Hall, Toronto	104,799 54	3,476 78	2,542 69	110,819 01
Agricultural Hall, Toronto			324 00	324 00
Brock's Monument, Queenston Heights	2,249 09	797 72	198 25	3,245 06
Niagara River Fence	7,708 13	317 35		8,025 48
Muskoka District—Immigration Sheds at Gravenhurst	355 00			355 00
" Registry Office and Lock-up, Bracebridge	6,588 01	87 69	33 50	6,709 20
" Lock-up and Court Room at Huntsville	6,931 76	193 03	5 23	7,130 02
Algoma District—Court House and Registry Office, Sault Ste. Marie	7,958 24	168 04	1,276 73	9,403 01
" Residence for Gaoler do	1,425 04	470 90		1,895 94
" Three Lock-ups, Grand Manitoulin Island	8,189 61	56 55	188 70	8,434 86
" Lock-up at Killarney		679 99	50 00	729 99
" Lock-up at Bruce Mines			3,063 63	3,063 63
" Lock-up at Thessalon			844 09	844 09
Thunder Bay District—Registry Office and Lock-up, Port Arthur	19,673 33	382 13	428 53	20,483 99

Thunder Bay District—Addition to Gaol and Court House, Port Arthur	10,733 21	4,561 58		15,294 79
" " Lock-up at Fort William	3,617 15	1,050 18	158 55	4,825 88
" " Lock-up at Silver Islet, Lake Superior	2,304 79			2,304 79
Parry Sound District—Registry Office, Lock-up, etc, Parry Sound	7,947 19	274 51	4 60	8,226 30
" " Lock-up at Maganetawan	360 00	223 92	1 74	585 66
" " Lock-up and Court Room at Burk's Falls		3,153 21	1,526 47	4,679 68
Nipissing District—Lock-up at Mattawa	2,771 14	262 25	56 80	3,090 19
" Lock-up at North Bay	917 00	947 80	580 31	2,445 11
" Registry Office at North Bay		2,789 95		2,789 95
" Lock-up at Sudbury			53 45	53 45
Rainy River District - Lock-up and Court Room at Rat Portage, and Gaoler's residence	16,354 86	27 25	1,300 30	17,682 41
Provisional County of Haliburton—Registry Office at Minden	3,532 35	217 27		3,749 62
Lock at Young's Point	30,892 72			30,892 72
Lock at Balsam and Cameron Lakes	23,959 02			23,959 02
Lock and Works, Mary's and Fairy Lakes	41,974 48	3,460 73	520 60	45,955 81
Maganetawan Works—Lock, Dam and River, and Dam and Slide at Deer Lake	19,982 54	16,805 51	7,807 40	44,595 45
Georgian Bay Works	984 36		610 94	1,595 30
Landing Pier at Port Elgin	1,000 00			1,000 00
" Southampton		300 00		300 00
Muskoka Lakes Works	4,373 49	3,589 91		7,963 40
" " Lock and Bridges at Port Carling	39,993 02		1,207 92	41,200 94
" " Cut and Bridge at Port Sandfield	14,146 09		2,696 77	16,842 86
" " Muskoss Falls Works and Bridge at Bala	6,094 57		1,129 39	7,223 96
Nipissing Lake Works	7,341 43	1,840 74		9,182 17
Couchiching Lake Works	427 84			427 84
Mud Lake Works, Township of Dalton	1,502 32			1,502 32
Peninsula Creek Improvement		6,413 64	8,175 67	14,589 31
Stony Creek Works, Township of Ops	828 25			828 25
Scugog Lake Works—Dredging at Port Perry			977 53	977 53
Gull and Burnt Rivers Works	65,110 45	1,668 88	1,447 24	68,226 57
Muskoka River Works	38,198 93			38,198 93
Sydenham "	2,156 26			2,156 26
Nottawasaga "	5,915 09			5,915 09
Kaministiquia "	22,865 02			22,865 02
Scugog " (including Lindsay Lock and Swing Bridges)	75,176 24	4,285 94		79,462 18
Pigeon River Works	4,999 62			4,999 62
Otonabee "	4,962 42			4,962 42
Balsam "	4,080 95	1,452 91	3,270 59	8,804 45
Wye "	5,176 98			5,176 98
Nation "	5,877 23	2,000 00	3,000 00	10,877 23
Moira River Improvement, Township of Thurlow		2,135 22		2,135 22
Trent River Bridge	2,000 00			2,000 00
Washago and Gravenhurst Road	32,792 12			32,792 12
Washago Wharf	489 22			489 22
Portage du Fort Bridge	5,247 99			5,247 99
Des Joachim's Rapids, Bridge and Approaches	5,937 72			5,937 72
Surveys, Inspections, Arbitrations and Awards	38,277 88	1,704 16	1,346 61	41,328 65
Roads in Township of Ryerson	7,295 06			7,295 06
Clearings and Log houses on Free Grant Lands, Settlers' Homestead Fund	16,780 75			16,780 75
Aldborough Drainage Works	7,199 02			7,199 02
Brooke " "	34,747 73			34,747 73

No. 2.—Statement of the Expenditures on Public Buildings and Works—(Capital Account).—*Continued.*

NAME OF WORK.	Expenditures from 1st July, 1876, to 31st Dec., 1885.	Expenditure, 1886.	Expenditure, 1877.	Totals.
	$ c.	$ c.	$ c.	$ c.
Delaware " "	5,740 93			5,740 93
Dunwich " "	10,105 86			10,105 86
Ekfrid, Caradoc and Metcalfe Drainage Works	13,667 66			13,667 66
Grey Drainage Works	8,175 47			8,175 47
Moore " "	17,091 58			17,091 58
Mosa " "	12,714 75			12,714 75
Nissouri, West, Drainage Works	8,178 50			8,178 50
Raleigh " "	36,409 64			36,409 64
Russell " "	11,543 77			11,543 77
Sarnia " "	40,540 55			40,540 55
Sombra " "	53,169 04			53,169 04
Tilbury, East " "	35,297 62			35,297 62
Tilbury, West " "	31,577 06			31,577 06
Williams, East	2,221 75			2,221 75
Surveys, and Drainage of Swamp Lands, Provincial Account	36,448 51			36,448 51
Totals	4,975,837 70	280,412 21	431,651 64	5,687.901 55

DEPARTMENT OF PUBLIC WORKS, ONTARIO,
TORONTO, *January*, 1888.

J. P. EDWARDS,
Accountant, P. W.

No. 3.—Statement of Drainage Debentures purchased by the Government, on recommendation of the Public Works Department, in 1887.

MUNICIPALITY.	Number of By-Law.	Amount.
		$ cts.
Township of Ekfrid	409 and amending	1,020 00
" "	410 and amending	378 52
" "	414 and amending	531 00
" West Wawanosh	7 of 1885 and amending	400 00
" East Zorra	333 and 343 amending	3,819 00
" "	341 and 342 amending	2,911 71
" Southwold	352	2,303 00
" Ekfrid	417 and amending	1,660 46
" Dunwich	356	1,424 70
" Warwick	12 of 1887	950 00
" Moore	15 of 1887	968 00
Total		$16,366 39

J. P. EDWARDS,
Law Clerk, P. W.

Department of Public Works, Ontario,
Toronto, *January*, 1888.

No. 4.—Contracts and Bonds entered into with Her Majesty in 1887.

Date.	Work.	Subject of Contract.	Contractors.	Sureties.	——	Amount.
1887.						$ cts.
March 25.	Muskoka Lakes Works	Timber for bridge at Bala.	Joseph S. Wallis, of the Village of Port Carling.	Alexander McGillivray, of the Village of Port Carling, and John McGillivray, of the same place.	White pine timber, per M., B.M	15 00
					Oak timber, per M., B.M ...	20 00
March 25.	Maintenance of Locks, Dams, etc.	Timber for gates at Young's Point Lock.	Cornelius Young, of the Village of Young's Point.	P. P. Young, of the Village of Young's Point, and F. J. Young, of the same place.	White oak timber, per M., B. M.....	35 00
					Pine timber, 35 feet in length, 18 in. × 18 in. one end, 15 × 15 the other, per M., B.M....	16 00
					Pine timber, 12 feet in length and under, 2 in. × 12 in., per M., B.M	13 00
March 25.	Maintenance of Locks and Dams.	Timber for guide piers at head of canal above Young's Point Lock.	Cornelius Young, of the Village of Young's Point.	P. P. Young, of the Village of Young's Point, and F. J. Young, of the same place.	White pine timber, per M., B.M	15 00
					Cedar, 13 feet in length and under, per M., B.M.....	11 00
April 1...	Balsam River Works.	Timber for slide at Rosedale.	James O. Revell, of the Village of Norland, and John Perkins, of the same place.	Montgomery H. Revell, of the Village of Norland, and John Perkins, Jr., of the same place.	White pine timber, over 12 feet in length, hewn, per cubic foot	18
					White pine timber, 12 feet in length and under, per M., B. M.....	15 00
					Maple, sawn, per M., B.M..	15 00
June 9 ...	Agricultural College, Guelph.	Painting outside woodwork front and rear main building.	M. L. Sturdy, of the City of Guelph.	None.	.....	280 00
June 9 ...	Deaf and Dumb Institution, Belleville.	Erection of two balcony fire escapes.	John Rotten, of the City of Pittsburgh, U.S.	None.....	.....	700 00
June 14 ..	Government House, Toronto.	Construction of a water power lift, etc.	John Fensom, of the City of Toronto.	None.....	.....	1,050 00

June 14 ..	Agricultural College, Guelph.	New chemical laboratory and alterations in main building.	Frederick William Schwendimann, of the Village of Drayton.	Robert McWilliam, M.D., of the Village of Drayton, and Louis Noecker, of the Township of Maryboro'.	.....	7,145 00
June 14 ..	Deaf and Dumb Institution, Belleville.	Construction of an addition to the entrance lodge, and of a drain from the Bursar's cottage.	Thomas Luscombe, of the City of Belleville.	Michael Graham, of the City of Belleville, and Walter Alford, of the same place.	.....	629 00
June 22 .	Asylum for the Insane, Kingston.	Painting outside woodword, ironwork, etc.	Thomas David Robinson, of the City of Kingston, and James Shaw Robinson, of the same place.	None	.....	770 00
July 6....	Parliament and Departmental Buildings and Institutions, Toronto.	Coal and wood.	The Conger Coal Co., Limited, of the City of Toronto.	William McGill, of the City of Toronto, and Thomas A. Lytel, of the same place.	Scranton or Pittston large egg.....per ton Stove and nut..... " Briar Hill, soft..... " Hardwood .....per cord Pine wood..... " Charcoal.....per bbl.	5 50 5 75 5 25 5 25 4 00 1 50
July 11...	Blind Institute, Brantford.	Slate roofs over deck roofs of main building, and repairs to present slate roof, eavetroughs and down-pipes, etc.	John Brown, George W. Brown and Robert J. Brown, of the City of Brantford.	None.....	.....	2,164 00
July 21...	Ottawa Normal School.	Coal.	George W. McCullough, of the City of Ottawa.	H. H. Blanchet, of the City of Ottawa, and Cameron McCullough, of the same place.	White ash, large egg, per ton Briar Hill soft ..... "	5 75 8 00
July 21...	Ottawa Normal School.	Wood.	John Heney, of the City of Ottawa.	John O'Leary, of the City of Ottawa, and George O'Keefe, of the same place.	Hardwood .....per cord Pine wood ..... "	4 70 2 40
Aug. 18...	Rainy River District.	Construction of Gaoler's house at Rat Portage.	William R. Gerrie and C. N. Sterling, of the Village of Rat Portage.	None.....	.....	1,150 00
Aug. 19...	Agricultural College, Guelph.	Heating apparatus, new chemical laboratory.	The Peterborough Stove and Furnace Company, of the town of Peterborough.	None.....	.....	850 00
Sept. 9 ...	Agricultural College, Guelph.	Furniture (school) for new chemical laboratory.	Myron W. Burr and Frank C. Burr, both of the City of Guelph.	None.....	.....	515 00

No. 4.—Contracts and Bonds entered into with Her Majesty in 1887.—*Continued.*

Date.	Works.	Subject of Contract.	Contractors.	Sureties.	——	Amount.
1887.						
Sept. 9...	Reformatory for Boys, Penetanguishene.	Carpenter work, painting, tinsmithing, etc., at stables and sheds.	Robert Burdett, of the Village of Penetanguishene.	None.....	.....	3,040 00
Nov. 19...	Agricultural College, Guelph.	Alterations to the museum.	Frederick William Schwendimann, of the Village of Drayton.	Louis A. Noecker, of the Township of Maryboro', and Robert McWilliam, M.D., of the Village of Drayton.	.....	1,337 00
Dec. 16...	Balsam River Works.	Timber for reconstruction of lock at Rosedale.	Adam Hastings, of the Village of Norland.	James Hastings and John Harshaw, both of the Village of Norland.	White pine timber— 12×12, square, per lineal ft. 10×12, " " 18×21, " " 6×8, " " Planking, per M., B.M.. ...	 15 14 35 07 12 00

Department of Public Works, Ontario,
Toronto, *January*, 1888.

J. P. EDWARDS,
Law Clerk, P. W.

REPORT

OF THE

DEPARTMENT OF IMMIGRATION

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR

1887.

Printed by Order of the Legislative Assembly.

Toronto:
PRINTED BY WARWICK & SONS, 26 & 28 FRONT STREET WEST.
1888.

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REPORT

OF THE

COMMISSIONER OF IMMIGRATION

FOR THE

YEAR ENDING 31ST DECEMBER,

1887.

To the Honourable SIR ALEXANDER CAMPBELL, K. C. M. G.,
Lieutenant Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to submit the following Report on the operations of the Immigration Department, for the twelve months ending the 31st December, 1887.

In 1887, as compared with 1886, there was an increase of 15,013 in the number of passengers landed at Halifax, Quebec and Montreal, and of 4,435, in the number of immigrants who remained in the Province of Ontario. Farm and other labourers got ready employment at fair wages during the spring and summer, while mechanics had not to wait long before meeting with suitable employment. Clerks, teachers and persons seeking light employment have not been so successful in securing places congenial to their tastes.

FARM LABOURERS.

During the early part of the season a considerable number of farm labourers came from the rural districts of England, especially from Shropshire and other western counties. As many as sixty came in one lot, and were all hired by farmers on the day of their

arrival. They were, for the most part, vigorous men who had never done any other work than farming. After the season had opened in the Province of Quebec there was quite a falling off in this class of labourers, and consequently the orders of Ontario farmers could be filled only to a limited extent. Wages ranged from $15 to $20 per month, with maintenance for periods of six and eight months, while as high as $35 per month was paid for harvest work. Farmers in some districts had to pay as high as $200 per annum, with maintenance, for experienced men, and they complain that wages are higher in proportion to the price of farm products than heretofore.

Female Domestic Servants.

The number of domestic servants leaving the British Isles was less in 1887 than in former years ; of the number arriving at Quebec, few found their way to this province, the majority being engaged in Montreal, and other parts of the Province of Quebec. As a consequence remuneration for this class of service has increased. Good general servants are paid $10 a month with board, and in some cases $12 has been paid even to new arrivals.

The arrivals during 1886 and 1887 at the undermentioned ports were as follows:—

Total arrivals at Halifax in 1887	10,674
Total arrivals at Quebec in 1887	32,500
Total arrivals at Montreal in 1887	2,580
Total arrivals at Halifax, Quebec and Montreal, in 1887	45,754
Total arrivals at Halifax, Quebec and Montreal, in 1886	30,741
Increase in 1887	15,013

The following is a statement of the number of immigrants settled in the Province of Ontario, through the Ottawa, Kingston, Toronto, Hamilton, and London Agencies, with their nationalities, during the years 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885 1886, and 1887, respectively :—

Year.	English.	Scotch.	Irish.	German.	Other Countries.	Total.
1887	4,891	1,362	1,310	756	3,335	11,654
1878	6,124	1,785	1,551	620	2,975	13,055
1879	12,169	2,894	3,993	1,450	3,901	24,407
1880	7,980	3,027	4,518	1,197	2,569	19,291
1881	7,704	3,070	4,521	1,274	1.664	18,233
1882	10,873	3,173	6,322	1,033	1,290	22,691
1883	11,954	2,658	8,993	1,384	2,130	27,119
1884	11,020	2,623	3,783	1,716	3,136	22,277
1885	7,261	2,131	2,105	1,098	1,378	13,973
1886	8,344	2,268	2,497	936	1,243	15,288
1887	10,758	3,277	3,330	1,032	1,326	19,723

The above tables shews an increase of 4,435 in 1887 as compared with 1886.

OTTAWA AGEN

MONTH.	Arrived *via* St. Lawrence.	Arrived *via* United States.	Total Arrivals.	Passed through to the United States.	Went to Province of Quebec.	Went to Manitoba.	Remained in Ontario.	English.	Irish.
January	14	9	23	.....	2	.....	21	9	3
February	27	21	48	.....	2	1	45	14	6
March	51	17	68	.....	3	.....	65	26	5
First Quarter	92	47	139	.....	7	1	131	49	14
April	127	43	170	.....	16	.....	154	30	41
May	419	90	509	.....	73	4	432	190	81
June	297	55	352	.....	15	18	319	126	66
Second Quarter	843	188	1031	.....	104	22	905	346	188
July	261	22	283	.....	48	16	219	142	35
August	90	7	97	.....	14	.....	83	46	5
September	107	20	127	.....	13	27	87	32	25
Third Quarter	458	49	507	.....	75	43	389	220	65
October	129	16	145	.....	19	1	125	60	14
November	55	23	78	.....	13	11	54	24	5
December	45	24	69	.....	12	1	56	16	13
Fourth Quarter	229	63	292	.....	44	13	235	100	32
GRAND TOTAL FOR 1887	1622	347	1969	.....	230	79	1660	715	299
GRAND TOTAL FOR 1886	872	.....	1072	.....	.....	.....	1072	202	233

The total arrivals in and departures from Ontario in 1886 and 1887 respectively were as follows :—

	Via St. Lawrence.	United States.	Total Arrivals.	Passed through the Province.	Remained in Ontario.
1886	16,553	52,986	69,539	54,251	15,288
1887	23,788	65,789	89,577	69,854	19,723
Increase in 1887					4,435

The immigrants settled in this Province during the years 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886 and 1887, were distributed through its respective Agencies as follows :—

Year.	Ottawa.	Kingston.	Toronto.	Hamilton.	London.	Total.
1877.	431	743	2,534	6,590	1,356	11,654
1878.	416	746	4,602	6,348	943	13,055
1879.	608	1,134	9,509	10,639	2,517	24,407
1880.	767	1,363	7,094	8,241	1,826	19,291
1881.	977	2,187	7,779	6,227	1,063	18,233
1882.	2,248	5,473	8,404	5,365	1,201	22,691
1883.	2,670	3,984	11,233	7,535	1,697	27,119
1884.	3,033	3,196	7,229	7,176	1,643	22,277
1885.	1,398	1,877	5,166	4,698	834	13,973
1886.	1,072	2,173	6,045	4,705	1,293	15,288
1887.	1,660	1,983	8,606	6,419	1,055	19,723

In addition to the above immigrants, the following numbers were reported through the customs as having arrived and settled in Ontario :—

	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Ottawa and Ports within its Agency	No return	1,133	1,123 1,395*	1,131 968*	1,020	1,150	944
Kingston do	859	958	1,001	939	855	673	629
Toronto do	1,145	1,546	1,622	426	1,593	1,709	1,736
Hamilton do	930	1,138	1,366	1,179	987	912	1,218
London do	4,033	6,740	6,868	6,574	2,642	2,735	1,493
Total	6,967	11,515	13,378	11,217	7,097	7,179	6,020

*Sent from Quebec to other places within the Ottawa Agency.

STATEMENT shewing the number of persons who arrived at the undermentioned Ports of Entry, with the value of their effects, from the United States for settlement in the Province of Ontario from the 1st January to 31st December, 1887.

PORT OF ENTRY.	Total reported.	NATIONALITIES.					SEXES.			Value of Effects.
		Canadians.	English.	Irish.	Scotch.	Other Countries.	Males.	Females.	Children.	
										$ c.
Amherstburg	186	108	17	4	3	54	48	50	88	7481 00
Belleville	73	63	2	5	.....	3	20	24	29	4095 00
Brighton	19	18	.....	.....	.....	1	5	8	6	915 00
Brockville	122	70	.....	12	.....	40	35	47	40	5828 00
Cornwall	192	147	4	2	.....	39	49	57	86	4315 00
Cramahe	30	30	.....	.....	.....	.....	8	10	12	4110 00
Cobourg	16	8	1	7	.....	.....	4	5	7	675 00
Chatham	324	171	45	12	19	77	94	109	121	11756 00
Collingwood	79	42	11	.....	14	12	21	21	37	2080 00
Clifton	393	.....	99	23	19	252	116	121	156	29767 00
Colborne	29	12	2	.....	.....	15	7	9	13	1745 00
Darlington	11	11	.....	.....	.....	.....	4	4	3	470 00
Dundas	24	8	7	.....	1	8	10	9	5	1315 00
Erie	320	101	17	2	5	195	93	101	126	20773 00
Goderich	28	8	6	12	.....	2	9	10	9	865 00
Gananoque	95	74	.....	.....	.....	21	23	38	34	3130 00
Hamilton	425	92	131	31	21	150	111	131	183	23847 00
Kingston	177	73	5	.....	.....	99	50	58	69	8479 00
London	264	130	56	34	13	31	73	88	103	14605 45

Lindsay	42	7	29	2	2	2	8	12	22	2355 00
Morrisburg	85	48		13	7	17	20	26	39	2240 00
Napanee	29	16				13	7	10	12	590 00
Ottawa	402	218	42	28	31	83	111	119	172	17714 00
Oshawa	17	6	3	2		6	6	6	5	1035 00
Owen Sound	57	21		7	29		21	17	19	2661 00
Prescott	143	103	5	2		33	33	35	44	7178 00
Port Hope and Newcastle	63	51	5			7	17	19	27	1575 00
Picton	45	19	4	5		17	16	15	14	3620 00
Oakville	49	22	4	6	1	16	14	15	20	1625 00
Paris	57	24	14	3		16	15	15	27	3610 00
St. Thomas	187	119	23	2	3	40	63	58	66	13862 00
Stratford	299	129	30	24	18	98	80	101	118	13133 00
Saugeen	7	4			1	2	4	3		635 00
Trenton	55	47				8	17	16	22	2333 00
Toronto	1479	422	361	97	63	536	419	474	586	145847 00
Whitby*										
Windsor*										
Woodstock	198	143	24		8	23	56	71	71	12000 00
	6021	2565	947	335	258	1916	1687	1912	2391	378264 45

*No returns

PORTS OF ENTRY.	Total reported.	Value of Effects.
		$ c.
Ottawa	944	37,275 00
Kingston	629	28,662 00
Toronto	1,736	158,678 00
Hamilton	1,218	79,312 00
London	1,493	74,337 45
Total	6,020	378,264 45

The value of the effects of the Immigrants reported through Customs was:—

	1882.	1883.	1884.	1885.	1886.	1887.
Ottawa	$36,695	45,974	37,408	35,667	42,680	37,275 00
Kingston and ports within its Agency.	34,549	38,246	51,130	37,266	37,244	28,662 00
Toronto and ports within its Agency.	133,592	134,153	25,563	128,179	151,241	158,678 00
Hamilton and ports within its Agency.	55,190	65,103	60,214	56,961	58,709	79,312 00
London and ports within its Agency.	243,006	249,819	236,109	131,065	145,492	74,337 45
Total value	$503,032	$533,295	$410,424	$389,138	$435,366	$378,264 45
Total value in '81, '82, '83, '84, '85 and '86.	314,075	503,032	533,295	410,424	389,138	435,366 00
Increase	$188,957	$30,263			$46,226	
Decrease			$122,871	$11,286		$57,101 55

Table A shows the monthly, quarterly and yearly arrivals at, and departures from, the various Agencies, the nationalities of those Immigrants who settled in this Province, and the grand totals of 1886 and 1887 respectively.

The following statement shews the number of Immigrants who left the British Island for places out of Europe, and the percentage settled in Ontario, through Agencies, during the years 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, and 1887 respectively :—

Year.	Numbers Left.	Settled in Ontario.	Percentage.
1874.	241,014	25,254	10.55
1875.	173,809	17,655	10.16
1876.	138,222	11,432	8.27
1877.	119,971	11,654	9.77
1878.	147,66	13,055	8.84
1879.	217,163	24,407	11.23
1880.	332,294	19,291	5.80
1881.	392,514	18,233	4.64
1882.	413,288	22,691	5.49
1883.	397,157	27,119	6.83
1884.	304,074	22,277	7.32
1885.	264,986	13,973	5.27
1886.	330,881	15,288	4.62
1887.		19,723	

The following statement shows the aggregate number of children settled in this Province since 1868 by the undermentioned parties.

Year.	Miss Rye.	Miss Macpherson.	Mrs. E. Bilbrough Wallace.	Mr. Middlemore.	Rev. Dr. Stephenson.	Dr. Barnardo.	Shaftesbury's Boys' Home, London, Eng.	Cardinal Manning and others.	Total.
1868	5	.....	.....	.....	.....	.....	.....	.....	5
1869	187	.....	.....	.....	.....	.....	.....	.....	187
1870	253	194	.....	.....	.....	.....	.....	.....	447
1871	277	498	.....	.....	.....	.....	.....	.....	775
1872	185	321	.....	.....	.....	.....	.....	.....	506
1873	134	358	.....	102	.....	.....	.....	.....	594
1874	193	279	.....	50	81	.....	.....	.....	603
1875	.....	184	.....	78	43	.....	.....	.....	305
1876	.....	163	.....	71	.....	.....	.....	.....	234
1877	91	115	.....	83	28	.....	.....	.....	317
1878	42	68	79	86	32	.....	.....	.....	307
1879	96	95	126	57	24	.....	.....	.....	398
1880	68	114	129	41	22	.....	11	22	407
1881	117	90	158	60	43	.....	49	45	562
1882	118	183	153	70	41	51	24	139	779
1883	170	193	194	125	53	172	43	183	1133
1884	165	165	254	145	75	252	39	283	1375
1885	125	183	351	115	87	395	32	323	1611
1886	110	215	274	129	91	615	33	301	1768
1887	120	212	316	202	75	406	.....	77	1408
Total	2456	3630	2034	1414	695	1891	231	1373	13724

Expenditure.

The total expenditure on account of Immigration during the years 1882, 1883, 1884, 1885, 1886 and 1887 respectively, was as follows:—

——	1882.	1883.	1884.	1885.	1886.	1887.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Agencies in Europe	7125 25	9017 38	7690 27	5150 00	5150 00	5150 00
Agencies in Canada	2725 83	2900 46	6690 52	4964 63	4224 35	2485 22
Carriage of Immigrants in Ontario	4071 44	8842 41	12175 90	2852 74	780 58	809 34
Provisions for Immigrants, including medical attendance	6547 90	10211 58	7148 94	2959 16	2527 64	2948 31
Incidentals	1707 45	1706 06	2033 94	623 48	872 98	403 07
Immigration Pamphlet and Maps	.....	2743 00	1394 38	2538 10	3281 85	.....
Carriage of female domestics from Quebec	8236 80	12343 52	6235 97	.....	.....	.....
Total	30414 67	47764 41	43369 92	19088 11	16837 40	11795 94
Cost per head, including Immigrants settled through Agencies only.	1 34	76	1 94	1 36	1 10	59

The following statement, condensed from the Reports of the Commissioner of Crown Lands, shows the progress of the settlement of the Free Grant Districts since 1868:—

Year.	Number of Townships set apart.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots, the locations of which have been cancelled.	Number of patents issued.
1868	15	511	46336	82	2120	.....	.....
1869	24	566	56011	52	956	.....	.....
1870	14	1200	155427½	148	4585½	.....	.....
1871	1	1113	153105½	139	3452½	.....	.....
1872	18	875	115065	97	2268½	148	.....
1873	6	757	100603½	79	5038	381	.....
1874	10	919	119070	57	2144	453	755
1875	1	1387	186807	89	3896	381	570

STATEMENT of settlements in Free Grant Districts, etc.—*Continued.*

YEAR.	Number of Townships set apart.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots, the locations of which have been cancelled.	Number of patents issued.
1876	.....	1463	192858	110	2261	462	546
1877	4	1914	260801	149	5534	691	542
1878	1	2115	274238	188	6637	1118	472
1879	.....	1506	199500	123	4911	1018	513
1880	23	1292	181745	110	3621	870	487
1881	5	1077	153764	155	8870	781	487
1882	1	932	129535	150	5562	624	502
1883	1	985	134594	143	8927	587	790
1884	3	1157	161964	125	5809	635	609
1885	2	1236	175351	149	5998	563	581
1886	.....	1149	162734	133	5474	607	706
1887	4	902	122772	109	5694	612	549
Total	133	23056	3082281½	2387	93758½	9931	8109

STATEMENT shewing the number of Immigrants settled in Ontario, through Agencies, and reported through Customs, from 1868 to 1887.

YEAR.	Number settled through Agencies.	Number reported through Customs.	Total number settled.	Value of the effects of Immigrants reported through Customs.
1868			10873	No returns reported.
1869			15893	
1870			25590	"
1871			25842	"
1872			28129	"
1873			39184	"
1874	25444	6276	31720	Returns not complete.
1875	17655	4096	21751	$328236 00
1876	11432	7691	19123	279138 00
1877	11654	6225	17879	305662 00
1878	13055	4885	17940	311117 00
1879	24407	4420	28827	244618 00
1880	19291	5435	24726	258919 00
1881	18233	6967	25200	313075 00
1882	22691	11515	34206	503032 00
1883	27119	13375	49494	533295 00
1884	22277	11217	33494	405770 00
1885	13973	7079	21052	389138 00
1886	15288	7179	22467	435364 00
1887	19723	6021	25744	378264 45
Total	262242	102381	510134	$4686628 45

Further details will be found in the various appendices to this Report.

All of which is respectfully submitted.

ARTHUR S. HARDY,
Commissioner.

TORONTO, January, 1888.

APPENDICES.

No. 1.

ANNUAL REPORT OF PETER BYRNE, ESQ., IMMIGRATION AGENT, LIVERPOOL, ENGLAND.

ONTARIO GOVERNMENT AGENCY,
NOTTINGHAM BUILDINGS, 19 BRUNSWICK STREET,
LIVERPOOL, December 31st, 1887.

The Hon. ARTHUR S. HARDY,
Provincial Secretary, etc., Toronto.

SIR,—I have the honour to report that the operations of this agency during the past year have been conducted mainly with the two-fold object of disseminating information regarding our Province and directing the attention of the best classes of intending emigrants to the great advantages it offers, in nearly every department of human industry, to men of capital and enterprise.

I have advertised the agency to a limited extent and at a minimum cost in a considerable number of newspapers, chiefly those circulated among the agricultural population, and especially the tenant farmer class. But, in accordance with your instructions, I have incurred no expense for the purpose of holding public meetings to promote emigration, though I am at all times open to receive invitations to deliver addresses on the subject in relation to Ontario, and comply with such invitations when I am satisfied that it will be to the advantage of the Province to do so.

I have distributed during the year a large number of pamphlets, maps, leaflets and official reports, both through the medium of the Post Office and over the counter of the office, as well as directly among the rural population and through the principal agents of the Canadian steamship companies. I have avoided, as far as possible, an indiscriminate distribution of our printed matter whereby much of it is wasted through falling into wrong hands. On the contrary, I have tried to place it where it will be read with interest, and thus produce the effect intended by its dissemination, namely, to diffuse as widely as possible reliable information regarding the institutions, resources and capabilities of Ontario among the British public. With this object in view, I send from time to time copies of our pamphlets, maps, etc., to all the Public Free Libraries, etc., throughout the country, who gladly receive them for the use of their numerous readers. Among the publications which I have supplied to these institutions this year is "The School System of Ontario," the admirable hand-book prepared by the Honourable the Minister of Education for the Intercolonial Exhibition last year. The information contained in this publication is of the greatest interest to those persons who wish to acquaint themselves with our famous system of education; and not a few intending emigrants of the better class make very anxious inquiries on this subject. It is therefore a pleasure to be able to place in their hands a mass of official information, which cannot fail to surprise as well as to afford them the liveliest satisfaction.

The particular classes to whom I continue to give special attention and encouragement are (1) persons of varying amounts of capital who contemplate taking up either improved farms or free grants; (2) those desirous of engaging in manufacturing enterprise

of some kind; and (3) those who, having independent means, are anxious to found a new home where better returns with equal security can be obtained for investments, and improved opportunities and prospects secured for their children. Besides supplying such persons with all the printed information at my disposal, I am careful to answer all their inquiries, whether by private conference or correspondence, adapting my information and advice, as far as possible, to the circumstances of each particular case.

A noticeable feature in the inquiries addressed to me during the past year has been an unusual number relating specially to fruit farming in Ontario—the prices of farms or lands suitable for the profitable cultivation of fruit, etc. This is no doubt due to the really grand display of Canadian fruits, especially apples, last year at the exhibitions in London and Edinburgh.

Many of those who apply to me about free grants think that with their small capital they would be sure to do well upon a free grant farm. I endeavour to temper the enthusiasm of such persons by pointing out to them the arduous nature of the task of locating and clearing a free allotment, and that it is, as a rule, far better for an Old Country emigrant, who is ambitious to possess a farm, to purchase or rent an improved property in the older settled districts if possible. This is the advice I invariably give to intending emigrants with capital who apply to me for information as to the occupation of land in Ontario. I endeavour to make it plain to them that the "improvements" upon an Ontario farm can nearly always be bought by an emigrant at a far less cost than he, with his Old Country methods and inexperience in the use of the axe, could possibly make them for himself. Persons of this class are naturally anxious to obtain the most precise information possible to enable them to form an estimate of what can be done in Ontario with a given amount of capital in the way of purchasing or renting an improved farm, and I therefore strive, as far as I possibly can, to satisfy their inquiries.

The establishment, by the Imperial Government, of an Emigration Bureau in London has led to an increase in the number of this class of enquirers, as the publications of the Bureau, which are issued to the public, contain the addresses of the various Colonial Agents, including that of the agent for Ontario, to whom application is recommended to be made for special information regarding our Province. The Imperial Bureau thus renders valuable aid in disseminating information regarding the colonies.

I may here mention my indebtedness to our own Provincial Bureau of Statistics, whose valuable reports, with their careful compilation of facts and figures regarding the labour market and the various industries of the provinces, I find of the greatest use and importance to me in the prosecution of my duties.

Next to the capitalist class of intending emigrants, those most wanted in the Province are unquestionably female domestic servants. But for reasons I have repeatedly pointed out before, they cannot be induced to emigrate to any great extent; and much less now than formerly, when substantial assistance was granted them. Good servants are so much in demand here that nothing short of a free passage and high wages would be sufficient to attract them across the Atlantic in numbers large enough to satisfy the demand of the Province.

The farm labourer, once almost as eagerly desired in Ontario as the domestic servant, is in a very bad way in most parts of the Old Country just now, and, unfortunately, for much the same reason as renders him less welcome in Canada than he was a few years ago, namely, the extremely low prices of agricultural produce. The depression thus caused throughout the agricultural districts of Britain has caused the farmers to reduce the number of men they formerly employed. Consequently many are idle or earning a very precarious living by doing odd jobs of work wherever they can get them. Those of them (and they must be very few in number) who have means to emigrate and who apply to me for information, I strongly advise not to go out to Ontario except in the spring of the year. Then they ought to be welcome as settlers, for it is obvious that men in their circumstances, who have thrift and industry enough to save money to take them out, must form a very desirable addition to the population of a new country.

I continue to have very frequent inquiries from clerks, shopmen, mechanics, and not unfrequently from persons connected with the learned professions, to know if openings are to be found in Ontario. But I invariably discourage all such from going out on the

chance of finding employment either in their own respective callings or in any capacity whatever. I have reason to know, however, that some go out in spite of the warnings to the contrary given them by the agents whom they consulted for advice.

A good deal of inquiry also comes from youths and young men anxious to find places with Ontario farmers with a view to learn practical agriculture. These I generally commend now to certain philanthropic and religious organizations which have facilities for finding suitable situations of this character for young men, but without charging them any premium for the service they render as do some private agencies established within the past few years.

The complete statistics of the emigration of the year I shall forward to you as soon as they are issued by the Board of Trade.

I have the honour to be,
Your obedient servant,

P. BYRNE,
Agent for Ontario.

No. 2.

ANNUAL REPORT OF EDWIN McC. CLAY, ESQ., DOMINION IMMIGRATION AGENT, HALIFAX.

DOMINION IMMIGRATION OFFICE,
INTERCOLONIAL RAILWAY STATION,
HALIFAX, NOVA SCOTIA, January 9th, 1888.

SIR,—I have the honour to submit for your information a report of the immigration at this port for the year ended the 31st December, 1887.

The total immigration for the year, you will observe, is 10,674, or 5,018 more than the year 1886.

The immigrants landing here have been of a very fine class, some of them bringing a large amount of capital into the country.

A larger number of children have landed here during the year than ever landed before, and, taking them altogether, were a very fine lot.

The year 1887 was a most prosperous one for Nova Scotia.

Yours obediently,

EDWIN McC. CLAY,
Dominion Government Agent.

DAVID SPENCE, Esq.,
Secretary Ontairo Immigration Department,
Toronto.

STATEMENT showing the number of Children Immigrants landed at the Halifax Agency during the year ended 31st December, 1887.

STEAMERS.	Date of Arrival.	By whom sent.	No. of Children.		REMARKS.
			M.	F.	
Parisian	March 28..	Dr. Barnardo	215	.....	Ontario and Quebec.
Circassian	April 10..	Mr. Fegan	127	.....	
"	" " ..	Miss MacPherson	69	.....	
"	" " ..	Miss Rye	.....	60	
Siberian	" 11..	Mr. Quarrier	128	....	
Sarnia	" 17..	Mr. Hayes	27	....	
Peruvian	May 7..	Miss Stirling	25	29	For Nova Scotia.
Nova Scotian	Aug. 27..	Mrs. Cameron	.....	18	For St. John, N. B.
Caspian	Sept. 24..	Miss Stirling	19	13	For Nova Scotia.
			610	120	

HALIFAX, N. S., Dec. 31st, 1887.

EDWIN McC. CLAY,
Dominion Government Agent.

MONTHLY RETURN of Immigrant Arrivals and Departures at Halifax, N. S., Immigration Agency for the year ending December 31st, 1887

MONTHS.	Number of arrivals *via* the United States.	DIRECT FROM EUROPE.			Total Number of Souls.	NATIONALITIES.							TRADES OR OCCUPATIONS.					GENERAL DESTINATION.									Amount brought in and value of effects.
		M.	F.	Children.		English.	Irish.	Scotch.	German.	Scandinavians.	French and Belgians.	Other Countries.	Farmers.	Farm and general Laborers.	Mechanics.	Clerks, Traders, etc.	Female Servants.	Lower Provinces. N. S.	Lower Provinces. N. B.	Lower Provinces. P. E. I.	Quebec.	Ontario.	Manitoba.	British Columbia.	Eastern States.	Western States.	
																											$ c.
January	23	180	71	46	297	221	23	20	20	....	8	5	42	120	12	6	33	86	3	3	70	83	24	4	24	....	5,950 00
February	22	339	114	56	509	388	67	28	15	4	3	4	90	197	41	11	49	144	8	8	57	184	56	35	11	6	12,780 00
March	33	1415	304	280	1999	1545	196	146	34	69	9	....	352	907	124	32	114	252	39	17	332	825	413	30	29	62	99,950 00
April	55	2147	604	629	3380	1916	244	276	289	478	45	132	222	1819	80	26	274	289	105	7	287	1312	652	106	30	592	125,000 00
May	79	266	128	110	504	304	93	74	....	10	20	3	16	243	6	1	52	322	30	7	25	72	5	....	43	....	25,000 00
June	58	195	119	46	360	314	28	14	....	4	....	....	26	156	13	....	70	279	20	....	3	14	....	....	43	1	22,000 00
July	68	206	149	75	430	374	47	5	....	....	....	4	24	170	10	2	61	355	34	7	26	7	....	....	1	....	23,500 00
August	78	172	158	85	415	369	20	19	....	....	7	....	10	147	10	5	141	260	47	5	6	65	....	....	32	....	20,600 00
September	63	152	150	105	407	307	23	32	1	5	29	10	14	133	3	2	74	308	37	5	24	19	5	....	9	....	19,400 00
October	27	137	131	87	355	306	16	5	....	4	14	10	13	112	3	9	67	204	43	17	27	19	13	....	32	....	17,500 00
November	79	543	301	164	1008	611	35	40	50	200	32	40	47	471	13	12	120	283	64	20	94	294	101	27	70	145	94,500 00
December	....	553	303	154	1010	606	47	35	55	158	27	82	162	359	30	2	157	215	46	15	194	234	87	18	65	136	94,700 00
	585	6305	2532	1837	10674	7261	839	694	464	932	194	290	1018	4834	345	108	1212	2997	476	111	1145	3038	1356	220	389	942	$560,780 00

December 31st, 1887.

EDWIN McC. CLAY,
Dominion Government Agent.

No. 3.

ANNUAL REPORT OF RICHARD MACPHERSON, ESQ., DOMINION IMMIGRATION AGENT, KINGSTON, ONTARIO.

GOVERNMENT IMMIGRATION OFFICE,
KINGSTON, 2nd January, 1888.

SIR,—I have the honour to present my annual report, showing the arrivals and departure of immigrants at this Agency for the twelve months ending 31st December, 1887. The value of money and effects brought by them to this Province, so far as I have been able to ascertain, amounts to the sum of $48,980. The number of settlers from the United States, who have made entries at the several ports of entry within my district during the past year, are not included in the enclosed statement, nor is the value of their effects shown.

Applications made at this office for immigrants during 1887 were not so numerous as in previous years. Still the demand for capable farm labourers and suitable female domestic servants far exceeded the supply, and I trust more of these classes may arrive within my district during the coming season.

From information obtained and my general observation while inspecting children brought to this Province during the past year, I am still of the opinion that this branch of immigration is beneficial to the country, and to the children placed with farmers in this Province. A very considerable amount of capital is annually brought from England to support the "Homes" and defray the necessary expenditure in connection with child immigration. The sum expended in this country during the past year in conducting Dr. Bernardo's work of child immigration exceeds $16,000, and that of "Marchmont Home," Belleville, under the control of Mrs. Wallace, $4,000. These amounts do not include the cost of outfit or ocean fares paid for the children's passage, but merely the sums actually expended in Canada in carrying out the work of these two "Homes." The outlay in connection with the 222 children placed in this Province by Mrs. Lacey during 1887 must also have been large, but I am not in a position at present to state the amount.

The health of the immigrants during the past year has been good, there having been no serious cases of illness, and but few instances where medical assistance was necessary.

No complaints have been made to me of inattention or neglect while travelling; but many immigrants have spoken of the kind treatment received on the different lines of railway from all classes of employees.

The manufacture and exportation of cheese have largely increased during the past few years, and the farmers within my district are giving more attention to the improvement of stock. The poultry product is also being more carefully looked after than in former years, and the exportation of fowl and eggs has attained large magnitude.

All of which is respectfully submitted.

I have the honour to be, Sir,
Your obedient servant,

R. MACPHERSON,
Government Immigration Agent.

The Honourable
THE COMMISSIONER OF IMMIGRATION,
Toronto.

STATEMENT showing the number of Immigrant arrivals and departures at the Kingston Agency for the twelve months ending 31st December, 1887, and their nationalities, the number of free meals and free passes by Railways, or other conveyances, from this Agency to their respective places of destination.

MONTHS.	Number of Arrivals *via* the St. Lawrence and Halifax.	Number of Arrivals *via* the United States.	Total Number of Souls.	Went to the United States.	Went to Province of Quebec.	Went to Manitoba.	Remained in the Province of Ontario.	Nationalities of Immigrants settled in Ontario.								Number of Free Meals.	Number of Immigrants fed.	Number of Free Lodgings.	Number of Free Passes.
								English.	Irish.	Scotch.	German.	Scandinavian	Swiss.	Icelandic.	American.	Other countries.				
January	5	6	11	....	....	1	10	5	4	....	....	....	....	....	....	1	....	....	....	....
February	15	....	15	....	....	....	15	10	3	2	....	....	....	....	....	....	....	....	....	....
March	233	....	233	....	....	....	233	223	8	....	....	2	....	....	....	....	....	....	....	....
April	189	9	198	....	....	....	198	56	22	120	....	....	....	....	....	....	....	....	....	....
May	525	....	525	....	....	....	525	415	76	34	....	....	....	....	....	....	....	....	....	....
June	296	....	296	....	....	....	296	145	22	129	....	....	....	....	....	....	....	....	....	....
July	95	1	96	....	....	1	95	77	10	7	1	....	....	....	....	....	....	....	....	....
August	178	....	178	....	....	....	178	125	37	16	....	....	....	....	....	....	....	....	....	....
September	218	2	220	....	....	....	220	188	22	10	....	....	....	....	....	....	....	....	....	....
October	131	1	132	....	....	....	132	100	22	10	....	....	....	....	....	....	....	....	....	....
November	59	....	59	....	....	....	59	45	9	5	....	....	....	....	....	....	....	....	....	....
December	22	....	22	....	....	....	22	14	4	4	....	....	....	....	....	....	....	....	....	....
Total	1966	19	1985	....	....	2	1983	1403	239	337	1	2	....	....	....	1	....	....	....	....

(Signed) R. MACPHERSON,
Agent.

No. 4.

ANNUAL REPORT OF JOHN A. DONALDSON, ESQ., DOMINION IMMIGRATION AGENT, TORONTO, ONT.

Immigration Office,
Toronto, December, 31st, 1887.

Sir,—I have the honour to submit this, my twenty-seventh annual report, showing the working of this agency for the year ending 31st December, 1887.

The total number of Immigrants arriving and passing through here during that period were 17,641 souls, an increase of 6,000 over those reported last year. Of these, 16,228 came by way of Halifax and Quebec, and 1,413 by the various ports of the United States. Their destinations, as far as could be learned, were as follows :—

Remained in Ontario	8,606	against	6,045 in 1886.
Passed through to the Northwest	498	"	1,976 "
Passed through to the Western States	8,537	"	3,620 "

But very few Immigrants now going to the Northwest pass through this agency, most of them now taking the all-rail route from Quebec and north of Lake Superior, who are not counted here, and this accounts for the apparent smallness of these numbers.

A marked improvement is noticeable in the class of Immigrants arriving this year over former years. But very few required assistance, further than being directed to where employment could be obtained, and almost all were able to pay their way to their different destinations. The greater number of those arriving accepted work in the country parts, those remaing in the city being principally parties who had come out to join friends already here. The numbers sent for this way, by prepaid passages, has been far in excess of former years.

Not much sickness has occurred during the year, the Immigrants being, as a rule, of a very healthy class, the principal cases of illness being young children.

The demand for farm labourers, especially in the early part of the season, was far in excess of the supply, and it would be well for this class of labourers to arrive early in the year, by which means they could secure situations for the coming winter, besides which, the wages offered in the spring and summer months are in excess of those offered about August.

The applications for servant girls have been numerous, sometimes as many as thirty in a day have called at the office seeking help of this class, and have had to go away disappointed, as the number of servants arriving has been comparatively few. The demand also for girls in the country parts this year has been exceptionally large.

Quite a number of enquiries have been made during the year with reference to British Columbia, and there will doubtless be a large emigration to that Province during the coming year.

Our city continues to grow in every direction, and, notwithstanding the strikes in the building trade in the early part of the year, a very large number of buildings have gone up. Land is held at a high figure, which necessitates a superior class of building being erected, consequently house rent is getting heavier every year. The straightening of the River Don, at the east end of the City, has given work to a large number of men, in addition to enhancing the value of property very considerably in its vicinity. The numerous manufactures still continue to grow and extend their premises, notably the Messrs. Massey, Agriculture Implement makers, who this year have built a considerable addition to their works, thus making it one of the largest of its kind in the country.

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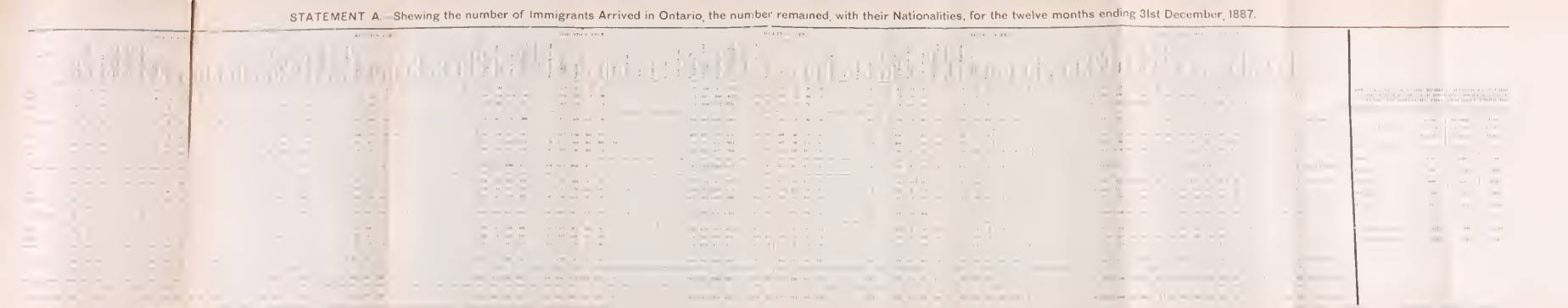
STATEMENT A.—Shewing the number of Immigrants Arrived in Ontario, the number remained, with their Nationalities, for the twelve months ending 31st December, 1887.



A number of children brought out by the various Homes passed through here durin the season, and were all of a healthy class. Some two hundred boys, ranging from 12 to 16 years of age, brought out by Dr. Barnardo, stayed over in Toronto for distribution. They were a fine strong lot of lads, and were eagerly hired by farmers immediately on their arrival, at very fair wages.

The noble gifts of the Hon. Mr. Stephens and the Hon. Donald Smith, for the purpose of founding a hospital in Montreal, and the handsome donation of the Hon. Mr. Macdonald, of Toronto, for a similar purpose, are evidences of the growing prosperity of the country.

In closing this report I must again draw attention to the civility and courtesy extended to the Immigrants travelling over the various lines of railway to and from this city, no complaint of any kind having been received.

All of which is most respectfully submitted.

I have the honour to be, sir,
Your obedient servant,

J. A. DONALDSON.

To David Spence, Esq.,
Secretary Department of Immigration,
Toronto.

Statement shewing the number and destinations of Immigrants, being farm labourers and domestic servants, forwarded from this Agency by free passes for the twelve months ending December 31st, 1887.

Stations.	Adult passes.	Stations.	Adult passes.
Acton	2	Brantford	11
Agincourt	1	Brigden	2
Allandale	1	Bright	2½
Aurora	7½	Bronte	1
Ayr	2	Brussels	1
Alvinston	3	Burford	5
Barrie	1	Burketon	2½
Batteau	1	Burk's Falls	26
Beeton	2	Burlington	1
Berlin	1	Cainsville	2
Bolton	4	Caledonia	2
Bowmanville	5	Canfield	1
Bracebridge	1	Cayuga	3½
Bradford	13½	Cardwell Junction	1
Brampton	7	Chatham	18

STATEMENT shewing the number and destinations of Immigrants—*Continued.*

STATIONS.	Adult passes.	STATIONS.	Adult passes.
Cheltenham	2	London	15½
Clarksons	3	Malton	3
Clinton	1	Markham	2
Cookstown	2	Meadowvale	5
Cooksville	1	Merritton	2
Collingwood	2	Milton	3
Comber	1½	Mitchell	7
Dundas	3	Mono Road	2
Eastwood	2	Moorfield	1
Edmonton	1	Mount Forest	6
Elora	2	Mount Vernon	1
Emsdale	1	Newcastle	2½
Essex Centre	1	New Lowell	8½
Fordwich	1	Newmarket	2
Garnet	1	Niagara Falls	6
Georgetown	1	North Bay	2
Goldstone	3	Norval	5
Gravenhurst	8½	Oakville	7½
Guelph	2	Orangeville	3
Hendrie	1	Orillia	5
Hensall	2	Oshawa	2
Hornby	1	Owen Sound	2
Ingersoll	10	Paris	14½
Islington	4½	Parkhill	3
Jarvis	1	Peterborough	4
Kincardine	6	Petersburgh	2
King	17	Pickering	2
Kinmount	2	Port Carling	3
Kleinburg	8½	Port Dover	6
Lakefield	1	Port Sandfield	1
Lefroy	1	Powassan	1
Lewisville	1	Princeton	9
Lisle	1	Preston	1

STATEMENT shewing the number and destinations of Immigrants—*Concluded.*

STATIONS.	Adult passes.	STATIONS.	Adult passes.
Richmond Hill	9	Thornhill	4
Rockwood	2	Thornton	2
Rosseau	4½	Thorold	2
Scarborough	3	Tilsonburg	2
Seaforth	5½	Utterson	1
Shelbourne	2	Victoria Road	1
Simcoe	11	Weston	4
South River	3	Wiarton	9
Stayner	1	Windsor	1
Stratford	1	Wingham	11
Strathallan	2	Winona	1
Streetsville	2	Woodstock	12
St. Catharines	10½	Wyevale	1
St. George	3		
St. Thomas	2	Total	481½
Thamesville	2		

STATEMENT showing the number of Immigrant arrivals and departures at the Toronto Agency for the twelve months ending December 31st, 1887, and their nationalities, the number of free meals and free passes by railways, or other conveyances, from this Agency to their respective places of destination.

MONTHS.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	Total Number of Souls.	Went to the United States.	Went to the Province of Quebec.	Went to Manitoba.	Remained in the Province of Ontario.	NATIONALITIES OF IMMIGRANTS SETTLED IN ONTARIO.								Number of Free Meals.	Number of Immigrants fed.	Number of Free Lodgings.	Number of Free Passes.
								English.	Irish.	Scotch.	German.	Scandinavian.	Swiss.	Icelandic.	American.	Other Countries.				
January	133	44	177	75	.....	.....	102	67	19	11	5	.....	.....	.....	.....	.....	120	.....	.....	17
February	160	94	254	80	.....	.....	174	115	33	26	.....	.....	.....	.....	.....	.....	131	.....	.....	15
March	349	263	612	211	.....	.....	401	218	112	71	.....	.....	.....	.....	.....	.....	405	.....	.....	40
April	1792	584	2376	919	.....	.....	1457	1006	284	167	.....	.....	.....	.....	.....	.....	797	.....	.....	56
May	4525	61	4586	2794	.....	81	1711	944	361	392	14	.....	.....	.....	.....	.....	903	.....	.....	74
June	3092	32	3124	1716	.....	87	1321	700	262	354	5	.....	.....	.....	.....	.....	537	.....	.....	80
July	1594	91	1685	839	.....	75	771	424	189	151	7	.....	.....	.....	.....	.....	387	.....	.....	43
August	1694	44	1738	626	.....	95	1017	579	283	148	3	4	.....	.....	.....	.....	368	.....	.....	43
September	1105	47	1152	432	.....	90	630	394	140	96	.....	.....	.....	.....	.....	.....	366	.....	.....	41½
October	1050	48	1098	485	.....	50	563	352	125	86	.....	.....	.....	.....	.....	.....	322	.....	.....	24
November	338	54	392	140	.....	10	242	150	57	35	.....	.....	.....	.....	.....	.....	194	.....	.....	19
December	396	51	447	220	.....	10	217	124	59	28	5	1	.....	.....	.....	.....	156	.....	.....	29
Totals	16228	1413	17641	8537	.....	498	8606	5073	1924	1565	39	5	.....	.....	.....	.....	4686	.....	.....	481½

J. A. DONALDSON,
Agent.

No. 5.

REPORT OF JOHN SMITH, ESQ., IMMIGRATION AGENT, HAMILTON, ONTARIO.

DOMINION OF CANADA IMMIGRATION OFFICE,
HAMILTON, Ontario, December 31st, 1887.

SIR,—I have the honour to submit the following annual report, with tabular statements, showing the arrivals and departures of immigrants at this Agency for the year ending 31st December, 1887.

The past year shows an increase of 1,925 immigrants settled in Ontario, as compared with the corresponding period of 1886.

There is a decrease of 654 passing through to Manitoba and the North-West Territories from the ports of New York, Boston and Philadelphia, the States of New York, Pennsylvania, and the States of New England.

There is an increase of 12,376 immigrants reported as passing through this Agency to the Western States.

Statement A shows the arrivals and departures of immigrants at this Agency.

Statement B shows the arrivals and departures, the number of free meals, lodgings, and free passes by railways.

Statement C shows the monthly arrivals and departures, the general destination, the capital brought into Canada, and the value of immigrants' effects.

Statement D shows the monthly arrivals of immigrants *via* the St. Lawrence and settling in Ontario.

Statement E shows the monthly arrivals of immigrants *via* the United States settling in the Dominion, and those passing through to the Western States.

Statement F shows the arrivals and general destination of the immigrants.

Statement G shows the number of children brought into and settled in Canada by the Philanthropic Societies.

Statement H shows the number of immigrants to whom assistance has been rendered by the Agency.

Statement I shows the amount of capital reported as brought into Canada.

Statement J shows the number of passes granted and destination of the immigrants.

Statement K shows the number of immigrants settled in Canada and their destination.

Statement L, M, N and O shows the number of immigrants and the value of their effects, as reported at the respective Ports of Entry.

Statement P shows the total number of immigrants and the value of effects reported at the customs Ports of Entry.

Statement Q shows the number of immigrants settling in Canada, and those passing through to the Western States.

Statement R shows the rate of wages paid in the district of the Hamilton Agency.

Statement S shows the prices of the different articles of food entering into general consumption by the working classes.

The immigrants arriving at this Agency and settling in the Dominion during the past season have been a desirable and good class, most of them requiring little or no assistance, being self-reliant and capable of providing for themselves.

The number of mechanics who arrived and reported themselves at this Agency during the year numbered fifty-nine, all of which found ready employment.

A large majority of the immigrants that arrived here consisted of agricultural and general labourers with their wives and families, who really found employment on arrival, being a useful class of settlers, well adapted to the wants of the country.

During the year a number of young men arrived for the purpose of acquiring a knowledge of Canadian farming, with the view of taking up homesteads for themselves in the North-West, or purchasing improved farms in Ontario after they had acquired the practical experience so as to enable them to invest their capital to advantage. A number of them have gone to Manitoba this fall after being located with our farmers for a couple of years, and others are intending to follow them in the spring.

There has been an active demand for all kinds of agricultural and general labourers and female domestic servants, also for all classes of operatives, artizans and skilled mechanics in the building trades. There has also been a better demand for mechanics connected with the iron industries, but not to the extent of giving encouragement to this class of immigration.

There is a steady and growing demand for immigrants at this Agency. The arrivals have been easily located until the winter set in, and since then we have had very few, with the exception of those who have been sent for by their friends and who have secured employment for them.

Agricultural Labour

Has been in great demand during the past year, the applications being largely in excess of the supply. The Agency has not been able to supply seventy per cent. of the number applied for, which caused a good deal of disappointment to the farming community. Wages have been well maintained, $150 to $180 being paid by the year for all first-class hands, and $12 to $15 by the month for the year; and from $15 to $20 per month for the summer season including May and September; and from $25 to $35 per month for the harvest season. The above rates include board and lodging.

Female servants have been largely sought after during the year, the applications being out of all proportion to the supply. There is a steady demand for all classes of female domestics, both for town and country, with a tendency to advancing wages. This class of immigrants can readily find employment at any season of the year.

Mechanics

There has been a decided improvement in the demand for all classes of mechanics during the past season, including vice and lathe hands, fitters, millwrights and pattern makers, but this class of emigration should be left to take its natural course without receiving any assistance from the Government, leaving the supply and demand to regulate itself.

Juvenile Immigration.

The Societies having Homes in the Hamilton District, referred to in Statement G, have brought out about the same number during the present season as on previous years.

The children brought out will compare favourably with those sent out during the period that the Societies have been engaged in this class of emigration.

The Superintendents and Matrons, having the charge of the Homes, have been assiduous in the selection of applicants for the children, having in some instances declined the applications, owing to the undesirability of placing the children where any doubt existed that the welfare of the child was not assured previous to its adoption.

The general result of the work in the Hamilton district is encouraging in its character, the children being well cared and provided for, being educated in the day schools, and their religious duties are carefully attended to by those having charge of them.

The time has arrived when this class of work can be judged by its results; and from special enquiry and by personal inspection, I find that the work has been largely successful, the child having emerged into womanhood, the boys have realized man's estate. In making my inspections I find a large percentage of the women have married farmers' sons and are established in homesteads of their own, and it is quite common to find that they have been well and liberally provided for by the parties adopting them.

A number of the boys have placed their wages in the Savings Banks, and many of those grown up have gone out to Manitoba and the Territories, taking up their homesteads under the liberal provision of the Dominion Government.

The principal applications for these children come from the farming community in the country, where there is a good demand for them. Applications from the cities are not desirable for them, except in special cases, owing to the numerous temptations arising in all centres of population. The object should be to place these waifs as far as possible from coming in contact with temptation of any kind.

The Childrens' or the Stephenson's Home, situated in East Hamilton, has been very successful in its work, being presided over by the late Rev. Mr. Evans, a gentleman remarkably adapted for this class of work. A strong feature of this Home consists of the sympathy and assistance extended to the children placed out by them, who are encouraged to keep up their connection with the Society whose Home is ever open to them, and at Christmas time all are welcome to join in the annual dinner. The lads sent out, as a rule, have been successful, the majority of them having deposits in the Savings Bank. The Home is now presided over by Mrs. Evans, the coadjutor of her late husband, who has yearly visited the boys under their charge, and which has resulted largely to the success of the boys and to the credit of the institute.

There is some fear of this work being overdone by the different Philanthropic Societies and by the Board of Guardians and others interested as an economic measure in relieving themselves of the burthen of their support, by the payment of a fee to have them transported to the Colonies.

In view of the phase of this class of work it will be desirable to exercise a close and rigid supervision of it, and any society, individuals or steamship company engaged in bringing out any undesirable children; in all cases they should be compelled to return all criminals and incompetent and impotent ones.

In reference to children taken from Reformatories and Industrial Schools, or in other words, from prison, they are not desirable, and parties engaged in this traffic should not be allowed to land them; for whilst some of them might reform, the general tendency is to lapse back to crime, more especially if they are subjected to temptation.

The children sent out by the Trustees of the Northumberland Village Homes had all received a partial training before leaving, which enabled them to obtain situations on their arrival here. The girls sent out by James Hall, Esq., one of the Trustees, are the finest and best ever sent out to Canada and are all doing well, and in the district where they have been settled the name of the Home is a sufficient guarantee for the efficiency and integrity of the girls. During the summer Mr. J. Stanley Metcalfe, of Newcastle-on-Tyne, an associate of the Homes, paid a visit here and expressed himself pleased with the improvement that had taken place in the girls since they left the Tyne.

The Self Help Emigration Society have again sent out a number of emigrants, principally consisting of well deserving families, who are all doing well. This Society is the most practical of any engaged in assisted emigration, as they not only assist the emigrant to pay his passage and railway fare, but on arrival in Canada a sufficient sum is remitted to pay their expenses until such time as employment is secured for them.

There are other societies engaged in shipping emigrants who do not take the same precautions, and are the means of causing a great deal of disappointment to the immigrants on arrival here, by making false promises to them, leading them to suppose that situations will be procured for them on presentation of letters, granted to them before leaving, to representative men here, for which the poor emigrant has been charged five shillings. Such letters have been addressed to myself by Mr. W. H. Newitt, Secretary of the Young Men's Christian Association, of Manchester, such letters being of no use when presented.

Some of the Church Societies are also in the habit of giving such letters, which are of a misleading character to the parties receiving them, and are the source of hopes destroyed, by taking away the spirit of self-reliance which ought and should pervade every emigrant, in order to secure that success attainable by all possessed of independence and perseverance.

The more that intending emigrants can be directed to the officials of the Government

and the duly accredited agents of the steamship companies for information, the better it will be for all concerned.

There is another source of trouble and disappointment arising from persons having paid premiums to designing parties for their sons to learn Canadian farming. This is a delusion and a snare, as all young men who are willing and able to work can be placed by the Dominion and Provincial Immigration Agents, and instead of paying a premium, the farmers are glad to pay wages, with board and lodgings, thus placing the employed and the employer on a mutual and reciprocal basis.

In reference to juvenile or child emigration, it should be made imperative upon the society or individuals bringing out children to have them visited in their new homes during the first year, for the purpose of seeing how the child is being treated, and, if necessary, to take steps to have it returned to the Home from which it was sent, and this should be done independent of any Government inspection.

In alluding to children taken from the Industrial Schools and Reformatories, I do not include those taken from the workhouses presided over by the Board of Guardians, as most of these children are in every way desirable, having become wards of the State, not from any fault ot their own, but by the death of their parents. They have also the advantage of a scholastic training in addition to being taught habits of industry and discipline.

Free Grant Lands.

In the districts of Muskoka, Parry Sound and Nipissing there are some good available lands for settlement, and well adapted for settlers with families and a small amount of capital to carry them through the first year, or until such time as the first crop can be harvested.

One drawback to the settlers going into the free grant district is the full local rates charged by the railways. If commutation fares and rates for household effects and stock were granted, it would encourage settlement and ultimately be a benefit to railway companies and the Province.

In the district of Temiscamingue there is a large tract of superior land awaiting settlement, which is being taken advantage of by the French inhabitants from the Province of Quebec, and the time is not far distant when the district will be the centre of a large population of hardy and industrious colonists.

In the districts of Muskoka, Parry Sound and Nipissing the lands are well adapted for grazing purposes, being well sheltered and well provided with good water and railway accommodation ; but to make the lands available for such purposes, the land regulations should be so altered as to enable the Government to make such grants so as to induce graziers to establish stock farms.

All of which is respectfully submitted.

I have the honour to be, Sir,

Your obedient servant,

JOHN SMITH,

Dominion Government Immigration Agent.

The Honourable

The Commissioner of Immigration,

Toronto.

STATEMNT A.—Return of Immigrant arrivals and departures in the district of the Hamilton Agency, including those reported by the Customs Port of Entry and the Philantrophic Societies for the year ending December 31, 1887.

NATIONALITIES.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	SEXES. Males.	Females.	Children.	TOTAL.	NATIONALITIES. English.	Irish.	Scotch.	German.	United States Citizens.	Other Countries.	GENERAL DESTINATIONS. Ontario.	Manitoba.	Western States.
English	1865	6574				8439	8439						2917	270	5252
Irish	474	5141				5615		5615					720	120	4775
Scotch	548	3092				3640			3640				1181	191	2268
German	15	24412				24427				24427			687	367	23373
United States Citizens		1293				1293					1293		909	384	
Other Countries	5	22965				22970						22970	5	378	22587
	2907	63477	32116	11450	22818	66384	8439	5615	3640	24427	1293	22970	6419	1710	58255
Philanthropic Society	435				435	435	240		195				435		
Customs Returns		1115	316	339	460	1115	263	76	58	103	390	225	1115		
Total, 1887	3342	64592	32432	11789	23713	67934	8942	5691	3893	24530	1683	23195	7969	1710	58255
Total, 1886	1934	52353	25345	10053	18889	54287	7893	6107	3787	18886	1595	16019	6044	2364	45879
Increase	1408	12239	7087	1736	4824	13647	1049		106	5644	88	7176	1926		12376
Decrease								416						654	

STATEMENT B.—Shewing the number of arrivals and departures of Immigrants at the Hamilton Agency, including those reported by the Philanthropic Societies and the Collectors of Customs at the Ports of Entry, the number of free meals, lodgings and free passes for the year ending December 31st, 1887.

1887.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	Total Number of Souls.	Remained in the Province of Ontario.	Went to Manitoba.	Went to Western States.	NATIONALITIES OF IMMIGRANTS SETTLED IN ONTARIO.						Number of free meals.	Number of Immigrants fed.	Number of free lodgings.	Number of free passes.
							English.	Irish.	Scotch.	German.	United States Citizens.	Other Countries.				
18	2907	63477	66384	6419	1710	58255	2917	720	1181	687	909	5	1022	608	39	291
Philanthropic Societies	435	.....	435	435	.....	.....	240	.....	195	.....	.....	.....	.....	.....	.....	.....
Customs Returns	.....	1115	1115	1115	.....	.....	263	76	58	103	390	225	.....	.....	.....	.....
Total, 1887	3342	64592	67934	7969	1710	58255	3420	796	1434	790	1299	230	1022	608	39	291
Total, 1886	1934	52353	54287	6044	2364	45879	2273	559	1062	702	1173	275	886	332	19	205
Increase	1408	12239	13647	1925	.....	12376	1147	237	372	88	126	.....	136	276	20	86
Decrease	.....	.....	.....	.....	654	.....	.....	.....	.....	.....	.....	45	.....	.....	.....	.....

STATEMENT C.—Yearly return of Immigrant arrivals and departures at the Hamilton Immigration Agency for the year ending December 31st, 1887.

1887.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	Sexes.			Total number of Souls.	Nationalities.						General Destinations.			Total amount brought in and value of effects.
			Males.	Females.	Children.		English.	Irish.	Scotch.	German.	United States' Citizens.	Other Countries.	Ontario.	Manitoba.	Western States.	
																$ c.
January	27	2446	1150	467	856	2473	295	221	114	933	61	849	169	79	2225	33100 00
February	33	2307	1084	438	818	2340	294	247	136	788	91	784	184	121	2035	37450 00
March	159	3598	1792	674	1291	3757	487	411	227	1314	96	1222	383	133	3241	36100 00
April	407	4955	2592	934	1836	5362	902	458	295	1850	99	1758	712	150	4500	45100 00
May	558	7583	3980	1381	2780	8141	1062	558	400	3032	131	2958	922	165	7054	56650 00
June	376	8553	4374	1512	3043	8929	974	645	445	3439	130	3296	774	169	7986	70500 00
July	363	6513	3348	1170	2358	6876	877	513	334	2485	126	2541	724	142	6010	40500 00
August	335	7315	3735	1299	2616	7650	910	655	466	2927	139	2553	722	174	6754	60050 00
September	261	5494	2788	983	1984	5755	787	548	327	2117	109	1867	590	129	5036	39750 00
October	180	4914	2458	873	1763	5094	752	449	316	1789	103	1685	479	146	4469	25628 00
November	124	5165	2550	907	1832	5289	572	479	318	1970	102	1848	414	191	4684	31625 00
December	84	4634	2265	812	1641	4718	527	431	262	1783	106	1609	346	111	4264	32100 00
	2907	63477	32116	11450	22818	66384	8439	5615	3610	24427	1293	22970	6419	1710	58255	508550 00
Children's Homes	435	.....	.....	.....	435	435	240	.....	195	.....	.....	.....	435	.....	.....	....
Customs Returns	.....	1115	316	339	460	1115	263	76	58	103	390	225	1115	.....	.....	73565 00
	3342	64592	32432	11789	23713	67934	8942	5691	3893	24530	1683	23195	7969	1710	58255	582115 00
Via the St. Lawrence	.....	.....	.....	.....	.....	3342	2105	474	743	15	.....	5	3342	.....	.....	....
Via the United States	.....	.....	.....	.....	.....	64592	6837	5217	3152	24515	1683	23190	4627	1710	58255	.....
Total	.....	.....	.....	.....	.....	67934	8942	5691	3893	24530	1683	23195	7969	1710	58255	.....

STATEMENT D—Yearly return of Immigrant arrivals *via* the St. Lawrence at the Hamilton Agency and the departures for the year ending December 31st, 1887.

1887.	Total.	Nationalities.						Destinations.		
		English.	Irish.	Scotch.	German.	United States' Citizens.	Other Countries.	Ontario.	Manitoba.	Western States.
January	27	16	4	7				27		
February	33	16	9	8				33		
March	159	82	36	41				159		
April	407	346	26	35				407		
May	558	383	73	92	10			558		
June	376	204	95	77				376		
July	363	257	42	63	1			363		
August	335	211	71	48			5	335		
September	261	140	46	71	4			261		
October	180	116	21	43				180		
November	124	61	31	32				124		
December	84	33	20	31				84		
	2907	1865	474	548	15		5	2907		
Childrens' Home	435	240		195				435		
Total	3342	2105	474	743	15		5	3342		

STATEMENT E.—Yearly return of Immigrant arrivals *via* the United States at the Hamilton Agency for the Year ending December 31st, 1887.

1887.	Total.	Nationalities.						Destinations.		
		English.	Irish.	Scotch.	German.	United States citizens.	Other countries.	Ontario.	Manitoba.	Western States.
January	2446	297	217	107	933	61	849	142	79	2225
February	2307	278	238	128	788	91	784	151	121	2035
March	3598	405	375	186	1314	96	1222	224	133	3241
April	4955	556	432	260	1850	99	1758	305	150	4500
May	7583	679	485	308	3022	131	2958	364	165	7054
June	8553	770	550	368	3439	130	3296	398	169	7986
July	6513	620	471	271	2484	126	2541	361	142	6010
August	7315	699	584	418	2927	139	2548	387	174	6754
September	5494	647	502	256	2113	109	1867	329	129	5036
October	4914	636	428	273	1789	103	1685	299	146	4469
November	5165	511	448	286	1970	102	1848	290	191	4684
December	4634	494	411	231	1783	106	1609	262	111	4261
	63477	6574	5141	3092	24412	1293	22965	3512	1710	58255
Customs	1115	263	76	58	103	390	225	1115	.....	.....
Total	64592	6837	5217	3150	24515	1683	23190	4627	1710	58255

STATEMENT F.—Showing the number of Immigrants reported at the Hamilton Agency arriving *via* the St. Lawrence, Halifax and the United States, and the departures and their general destinations for the year ending December 31, 1887.

NATIONALITIES.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of arrivals *via* the United States.	Total.	GENERAL DESTINATIONS.		
				Ontario.	Manitoba.	Western States.
English	1865	6574	8439	3420	270	5252
Irish	474	5141	5615	796	120	4775
Scotch	548	3092	3640	1434	191	2268
German	15	24412	24427	790	367	23373
United States citizens	.....	1293	1293	1299	384	.....
Other countries	5	22965	22970	230	378	22587
	2907	63477	66384			
Philanthropic Societies	435	.....	435	.....	.....	.....
Customs returns	.....	1115	1115	.....	.....	.....
Total, 1887	3342	64592	67934	7969	1710	58255
Total, 1886	1934	52353	54287	6044	2364	45879
Increase	1408	12239	13647	1925	.....	12376
Decrease	.....	.....	.....	.....	654	.....

STATEMENT G—Showing the number of Children received in the District of the Hamilton Agency from the Societies engaged in Immigration for the year ending December 31, 1887.

NAME OF SOCIETY.	Boys.	Girls.	Total.	Number remaining in the Home Dec. 31, 1886.	Number remaining in the Home Dec. 31, 1887.
Rev. Mr. Stephenson's Home	46	29	75	9	6
Miss Rye's Home	3	120	123	9	10
Miss McPherson's Home	113	82	195	30	20
Earl Shaftesbury's Home	42	.....	42	2	.....
	204	231	435	50	36

STATEMENT H.—Shewing the number of Immigrants assisted, the number of meals and lodgings and free passes issued by Railway from the Hamilton Agency for the year ending December 31st, 1887.

1887.	Number fed.	Number of Free Meals.	Number of Free Lodgings.	Number of Passes Issued.
January	37	87	4	20
February	11	43	6	16
March	32	46	5	29
April	146	206	3	54
May	102	183	4	26
June	78	136	2	26
July	47	74		22
August	60	66		35
September	34	45	5	22
October	36	46	4	18
November	21	86	4	13
December	4	4	2	10
Total, 1887	608	1022	39	291
Total, 1886	332	886	19	205
Increase	276	136	20	86
Decrease				

STATEMENT I.—Shewing the amount of Capital brought to Canada by Immigrants and settlers in the district of the Hamilton Agency for the year ending December 31st, 1887.

1887.	1887.	1886.	Increase.	Decrease.
	$ c.	$ c.	$ c.	$ c.
January	33,100 00	22,850 00		
February	37,450 00	25,620 00		
March	36,100 00	45,300 00		
April	45,100 00	62,700 00		
May	56,650 00	59,280 00		
June	70,500 00	50,100 00		
July	40,500 00	70,900 00		
August	60,050 00	56,200 00		
September	39,750 00	48,300 00		
October	25,625 00	28,650 00		
November	31,625 00	30,500 00		
December	32,100 00	37,500 00		
	508,550 00	537,900 00		29,350 00

STATEMENT J.—Shewing the number and destinations of Immigrants forwarded by free passes from the Hamilton Agency for the year ending December 31st, 1887.

DESTINATIONS.	Number of passes.	DESTINATIONS.	Number of passes.
Allanburgh	1	Lucknow	1
Berlin	1	Merritton	1
Brampton	3	Mount Brydges	1
Ballsville	2	Milton	1
Burlington	6	Niagara Falls	15
Bronte	1	Orillia	2
Brantford	10	Port Dover	1
Caledonia	14	Paris	1
Collingwood	11	Port Credit	2
Cotecau	1	St. Catharines	25
Cardwell	2	Stewarton	2
Cayuga	2	St. George	1
Carlton Junction	1	St. Annes	1
Clavering	2	Toronto	38
Dunnville	10	Tecumseh	1
Dundas	2	Thorold	7
Elora	1	Tottenham	1
Eastwood	1	Walkerton	1
Garnett	3	Windsor	1
Gravenhurst	1	Woodstock	4
Grimsby	6	Wiarton	1
Guelph	4	Wyevale	1
Galt	3	Winona	18
Hagersville	21	Welland	3
Hanover	1	Waterdown	11
Harrisburgh	5	York	1
Jarvis	5	Zimmerman	3
Ingersoll	13		
London	13	Total	291

STATEMENT K.—Shewing the location of Immigrants reported in the district of the Hamilton Agency, including those sent out by the Philanthropic Societies and those reported by the Customs Ports of Entry in the Hamilton district for the year ending December 31st, 1887.

COUNTY.	No.	COUNTY.	No.
Algoma	25	Muskoka	55
Bruce	167	Monk	46
Brant	267	Manitoba	1710
Durham	10	Norfolk	254
Dufferin	44	Northumberland	12
Essex	143	Nipissing	13
Elgin	225	Ontario	25
Frontenac	9	Oxford	349
Grey	102	Peterboro'	5
Grenville	7	Peel	137
Halton	203	Perth	411
Haldimand	138	Renfrew	18
Huron	201	Stormont	7
Hastings	9	Simcoe	162
Kent	223	Wentworth	1493
Lincoln	382	Wellington	196
Leeds	8	Waterloo	224
Lambton	142	Welland	846
Lanark	13	York	1006
Middlesex	392	Total	9679

STATEMENT L.—Shewing the number of Immigrants reported at the Port of Hamilton and the value of their effects for the year ending December 31st, 1887.

NATIONALITY.	Males.	Females.	Children.	Total.	Value of Effects.
					$ c.
English	37	41	69	147	7,320 00
Irish	11	12	19	42	1,070 00
Scotch	11	9	14	34	1,340 00
German	10	10	25	45	3,985 00
United States Citizens	26	32	28	86	6,607 00
Other Countries	5	7	10	82	1,350 00
	100	111	165	376	21,672 00

STATEMENT M.—Shewing the number of Immigrants reported at the Port of Niagara Falls and the value of effects for the year ending December 31st, 1887.

NATIONALITY.	Males.	Females.	Children.	Total.	Value of Effects.
					$ c.
English	33	28	38	99	7,185 00
Irish	6	8	9	23	650 00
Scotch	8	5	6	19	1,495 00
German	11	11	18	40	1,175 00
United States Citizens	32	45	42	119	13,332 00
Other Countries	26	24	43	93	5,930 00
	116	121	156	393	29,767 00

STATEMENT N.—Shewing the number of Immigrants reported at the Port of Fort Erie and the value of their effects for the year ending December 31st, 1887.

NATIONALITY.	Males.	Females.	Children.	Total.	Value of Effects.
					$ c.
English	7	5	5	17	1,690 00
Irish	1	1	.....	2	300 00
Scotch	1	1	3	5	200 00
German	5	6	7	18	485 00
United States Citizens	48	59	68	175	12,268 00
Other Countries	31	29	43	103	5,830 00
	93	101	126	320	20,773 00

STATEMENT O.—Shewing the number of Immigrants reported at the Port of Niagara and the value of their effects for the year ending December 31st, 1887.

NATIONALITY.	Males.	Females.	Children.	Total.	Value of Effects.
					$ c.
English	.....	.....	.....	.....	.....
Irish	1	1	7	9	28 00
Scotch	.....	.....	.....	.....	.....
German	.....	.....	.....	.....	.....
United States Citizens	5	4	1	10	1,300 00
Other Countries	1	1	5	7	25 00
	7	6	13	26	1,353 00

STATEMENT P.—Showing the number of Immigrants and the value of their effects entered at the respective Ports of Entry in the district of the Hamilton Agency for the year ending December 31st, 1887.

NATIONALITY.	Hamilton.	Niagara Falls.	Fort Erie.	Niagara.	Total.	Value of Effects.
						$ c.
English	147	99	17	.....	263	16195 00
Irish	42	3	2	9	76	2048 00
Scotch	34	19	5	.....	58	3035 00
German	45	40	18	.....	103	5645 00
United States' citizens	86	119	175	10	390	33507 00
Other Countries	22	93	103	7	225	13135 00
Total	376	393	320	26	1115	73565 00

STATEMENT Q.—Shewing the arrivals and destinations of Immigrants in the district of the Hamilton Agency *via* the St. Lawrence and the United States, including those brought out by the Philanthropic Societies and those reported by the Customs of Ports of Entry at Hamilton, Niagara Falls, Fort Erie and Niagara for the year ending December 31st, 1887.

1887.	English.	Irish.	Scotch.	German.	United States' Citizens.	Other countries.	Total.	Remained in Ontario.	Went to Manitoba.	Went to the Western States.
Via the St. Lawrence	2105	474	743	15	.....	5	3342	3342	.....	.....
Via the United States	6837	5217	3150	24515	1683	23190	64592	4627	1710	58255
Total 1887	8942	5691	3893	24530	1683	23195	67934	7969	1710	58255
Total 1886	7893	6107	3787	18886	1595	16019	54287	6044	2364	45879
Increase	1049	.....	106	5644	88	7176	13647	1925	....	12376
Decrease	.....	416	.....	.....	.....	.....	.....	.....	654	.....

STATEMENT R.—Rate of wages paid in the district of the Hamilton Agency during the year 1887.

EMPLOYMENT.	WAGES.	
	From	To
	$ c.	$ c.
Bookbinders and Printers	1 50	2 00
Blacksmiths	1 50	2 50
Bakers	1 25	1 75
Brewers	1 50	3 00
Butchers	1 25	1 50
Brickmakers	1 75	2 50
Bricklayers and Masons	2 75	3 25
Boiler-makers	1 50	2 25
Carpenters	2 00	2 25
Cabinet-makers	1 50	2 50
Coopers	1 50	2 00
Fitters	1 75	2 25
Labourers—common	1 12	1 50
" farm	1 12	1 25
" railway	1 25	1 37
Lath hands	1 50	2 00
Moulders	2 00	3 00
Millwrights	2 00	2 25
Millers	1 25	2 25
Painters	1 50	2 00
Plasterers	1 75	2 00
Plumbers	1 50	2 00
Shoemakers	1 25	2 00
Shipwrights	1 75	2 50
Stone-cutters	2 75	3 00
Saddlers	1 25	2 00
Fireman—locomotive	1 50	1 75
Tanners	1 50	1 75
Tailors	1 25	2 50

EMPLOYMENT.	WAGES.	
	From	To
	$ c.	$ c.
Patternmakers	1 75	2 50
Rivetter	1 50	1 75
Woollen Mills.		
Card-room	50	1 25
Spinners	1 00	1 50
Weavers	75	1 25
Dyers	1 00	1 50
Wool assorters	1 25	1 75
Cotton Mills.		
Card-room	50	1 00
Spinners	1 25	1 50
Weavers	80	1 25
Over-lookers	2 25	3 00
Females per month with board and lodging.		
Cooks	10 00	15 00
Dairymaids	7 00	10 00
Dressmakers and Milliners	10 00	15 00
General servants	7 00	10 00
Laundry maids	8 00	10 00
House-maids	8 00	10 00
Monthly hands with board and lodging.		
Farm labourers	12 00	20 00
Harvest hands	25 00	35 00
Lumbermen	15 00	25 00

STATEMENT S.—List of retail prices of the ordinary articles of food and raiment required by the working class.

ARTICLES.	PRICES.		ARTICLES.	PRICES.	
	From	To		From	To
	$ c.	$ c.		$ c.	$ c.
Bacon, per lb	8	13	Eggs, per doz	15	25
do Ham, per lb	10	15	Potatoes, per 60 lbs	80	90
do Shoulders, per lb	8	12	Salt do	45	50
Pork do	8	10	Firewood, per cord	4 50	6 00
Beef do	8	12	Coal, per 2,000 lbs	6 00	6 50
Mutton do	10	12	Coat, over	6 00	10 00
Veal do	8	12	do under	4 00	6 00
Butter, fresh do	20	25	Pants	2 00	4 00
do salt do	15	20	Vest	1 50	2 00
Candle do	..	12	Shirts, flannel	1 25	2 00
Cheese do	12	15	do cotton	50	1 00
Coffee do	25	40	do underwear	40	1 00
Codfish do	6	8	Drawers, woollen, woven	50	75
Mustard do	35	40	Hats, felt	1 00	1 50
Pepper do	25	35	Socks, worsted	25	50
Rice do	4	5	do cotton	10	25
Soap do	5	6	Blankets, per pair	2 00	5 00
Sugar do	6	10	Rugs	1 00	1 50
Tea, green do	40	75	Flannel, per yard	20	40
do black do	40	75	Cotton do	5	10
Tobacco do	50	60	do double sheeting, per yard	20	30
Cornmeal, per 100 lbs	1 75	2 00	Canadian Tweed cloth do	40	80
Flour do	2 00	2 50	Shoes, men's, per pair	1 50	2 00
Buckwheat Flour do	2 00	2 50	do women's do	1 00	1 50
Oatmeal do	2 50	2 75	Boots, men's do	1 75	2 50
Bread, per 4 lb loaf	10	11	do women's do	1 25	2 00
Milk, per quart	5	6	Rubbers, men's do	75	1 25
Herrings, per barrel	6 00	7 00	do women's do	50	75

JOHN SMITH,
Immigration Agent.

HAMILTON, December 31st, 1887.

No. 6.

ANNUAL REPORT OF A. G. SMYTH, ESQ., IMMIGRATION AGENT, LONDON, ONTARIO.

Dominion of Canada Immigration Office,
London, 31st December, 1887.

Sir,—I have the honour to enclose yearly returns to 31st December, 1887, on our usual tabulated forms.

The Immigarnts arriving at this Agency during the year have been of a good class, and they will make good settlers.

I may report they were all exceedingly healthy and secured employment with very little delay. Good agricultural labourers never find difficulty in having places to choose from.

Quite a number this season had means and good personal effects, and nearly $40,000 came into my district this season. At the same time many came who were poor and needy, and if some assistance in the way of meals and transportation could be given as formerly, it would be to them an act of very great kindness. Some who came out in former years and had such assistance are now well and make good settlers.

I will again refer to small numbers of domestic servants who reach this Agency, and of the many good openings there are here, if they could only be sent on so far.

The prospect for the coming season is good for farm hands and labourers, but all coming out under present regulations should certainly have cash to keep them a few days.

I have the honour to be, Sir,
Your obedient servant,

A. G. SMYTH,
Government Immigration Agent.

David Spence, Esq.,
Secretary Department of Immigration,
Toronto, Ontario.

STATEMENT showing the number of Immigrant arrivals and departures at the London Agency for the Twelve Months ending 31st December, 1887, and their nationalities, the number of free meals and free passes by railways, or other conveyances, from this Agency to their respective places of destination.

MONTHS.	Number of arrivals *via* the St. Lawrence and Halifax.	Number of Arrivals *via* the United States.	Total Number of Souls.	Went to the United States.	Went to Province of Quebec.	Went to Manitoba.	Remained in the Province of Ontario.	NATIONALITIES OF IMMIGRANTS SETTLED IN ONTARIO.									Number of Free Meals.	Number of Immigrants fed.	Number of Free Lodgings.	Number of Free Passes.
								English.	Irish.	Scotch.	German.	Scandinavian.	Swiss.	Icelandic.	American.	Other Countries.				
January	47	19	66	7	.....	6	53	32	9	8	2	.....	.....	.....	.....	2	.....	.....	.....	.....
February	52	34	86	14	.....	8	64	29	18	9	.....	7	.....	.....	.....	1	.....	.....	.....	.....
March	54	101	155	72	.....	14	69	43	9	5	.....	.....	.....	.....	.....	12	.....	.....	.....	.....
April	103	88	191	80	.....	36	75	47	13	11	3	.....	.....	.....	.....	1	.....	.....	.....	.....
May	208	62	270	102	.....	51	117	87	17	7	5	1	.....	.....	.....	.....	.....	.....	.....	.....
June	86	66	152	52	.....	14	86	76	4	4	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
July	105	43	148	27	.....	19	102	87	13	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
August	95	69	164	37	.....	5	122	65	22	19	12	.....	.....	.....	.....	4	.....	.....	.....	.....
September	61	31	92	23	.....	13	56	28	4	9	13	.....	.....	.....	.....	2	.....	.....	.....	.....
October	103	39	142	23	.....	15	104	68	14	7	15	.....	.....	.....	.....	.....	.....	.....	.....	.....
November	107	27	134	14	.....	17	103	74	17	3	5	.....	.....	.....	.....	4	.....	.....	.....	.....
December	98	55	153	27	.....	22	104	57	17	6	4	12	.....	.....	3	5	.....	.....	.....	.....
Total	1119	634	1753	478	.....	220	1055	693	157	90	61	20	.....	.....	3	31	.....	.....	.....	.....

A. G. SMYTH,
Agent.

STATEMENT shewing the number of Immigrant arrivals at the London Agency for the twelve months ending 31st December, 1887, and their nationality, the number assisted with provisions, and with free passes by Railways, or other conveyances, from this Agency to their respective places of destination.

COUNTRY FROM.	Arrivals *via* the St. Lawrence.	Arrivals *via* the United States.	Total.	Remained in the Province of Ontario.	Went to the United States.	Number assisted with provisions.	Number assisted with free passes.
England	679	246	925	693	232	.....	.....
Ireland	172	111	283	157	126	.....	.....
Scotland	96	105	201	90	111	.....	.....
Germany	108	83	191	61	130	.....	.....
Norway, Sweden	32	29	61	20	41	.....	.....
Switzerland	.....	.....	.....	.....	.....	.....	.....
Iceland	.....	.....	.....	.....	.....	.....	.....
America	.....	3	3	3	.....	.....	.....
Other Countries	32	57	89	31	58	.....	.....
	1119	634	1753	1055	*698	.....	.....

* 201 to Manitoba; 19 to British Columbia.

THE undersigned has the honour to report, for the information of the Honourable the Commissioner of Immigration, Ontario, as to the number of Immigrants arrived at this Agency, and their distribution, as per Schedule, for the period commencing 1st January, 1887, and ending 31st December, 1887.

NUMBERS.	*Via* St. Lawrence.	*Via* U. States.	Total.
1st.—The number of Immigrants arrived and remained to be dealt with at this Agency	1,119	634	1,753
2nd.—The number of free meals furnished to Immigrants	.....	.....	.....
3rd.—The number of Immigrants to whom free meals have been furnished	.....	.....	.....
4th.—The number of free lodgings furnished	.....	.....	.....
5th.—The number distributed by free passes on railways	.....	.....	.....
6th.—The number distributed by free passes on steamboats	.....	.....	.....
7th.—The number distributed by other means of conveyance	.....	.....	.....
8th.—The number furnished with employment in the locality of this Agency	.....	.....	478
9th.—The number passed on to the United States, 478; British Columbia and Manitoba, 220	.....	.....	698

STATEMENT shewing the total number of Immigrants arrived and remained to be dealt with at the London Agency for the twelve months ending 31st December, 1887.

MONTHS.	*Via* St. Lawrence.	*Via* the United States.	Total.	Number Fed.	No. distributed by Free Passes.
January	47	19	66		
February	52	34	86		
March	54	101	155		
April	103	88	191		
May	208	62	270		
June	86	66	152		
July	105	43	148		
August	95	69	164		
September	61	31	92		
October	103	39	142		
November	107	27	134		
December	98	55	153		
	1,119	634	1,753		

A. G. SMYTH,
Government Immigration Agent.

LONDON, 31st December, 1887.

REPORT

OF THE

COMMISSIONER OF CROWN LANDS

OF THE

PROVINCE OF ONTARIO

FOR THE YEAR

1887.

Printed by Order of the Legislative Assembly.

Toronto:
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1888.

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REPORT

OF THE

COMMISSIONER OF CROWN LANDS

OF THE

PROVINCE OF ONTARIO

FOR THE YEAR 1887.

To His Honour the Honourable Sir Alexander Campbell, K.C.M.G.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the honour to submit the Annual Report of the Department of Crown Lands for the year 1887.

CLERGY LANDS.

The sales of these lands during the year aggregated 1,585 acres. These sales represent $1,682.60. The collections on account of these and the sales of former years amounts to $7,433.70. (*See Appendix No. 3, page 4.*)

CROWN LANDS.

The area of Crown Lands sold during the year was 67,314 acres at a total value of $76,837.26. The collections on account amounted to $74,493.69. (*See Appendix No. 3, page 4.*)

COMMON SCHOOL LANDS.

The area of these lands sold during the year was 292 acres amounting in value to $619.75. The collections on account of Common School Lands was $17,489.93. (*See Appendix No. 3, page 4.*)

GRAMMAR SCHOOL LANDS.

The area of these sold during the year was 605 acres at a value of $556.00. The collection for the year was $3,184.06. (*See Appendix No. 3, page 4.*)

COLLECTIONS AND REVENUE.

The total collections from all sources for the year amounts to $1,118,892.82. (*See Appendix No. 4, page 5.*)

DISBURSEMENTS.

The gross disbursements on account of all services, etc., of the Department amounts to $241,733.50. (*See Appendix No. 6, page 7.*)

WOODS AND FORESTS.

The total collection for the year is $990,855.43, which includes $399,958.36 paid in on account of the sale held in December; the latter amount being deducted leaves $590,897.07 as the Revenue from timber dues, ground rent, etc., during the year. (*See Appendices Nos. 7 and 9, pages 10 and 12.*)

The collection on account of timber dues, etc., has fallen somewhat short of the amount estimated from Woods and Forests, the shortage, no doubt, being mainly attributable to the fact that a large number of sawlogs were, what is technically known as "stuck" in the streams, owing to the lowness of the water consequent upon the unprecedentedly dry weather of last summer; in addition to this a considerable quantity was left in the woods, the depth of snow in mid-winter and towards spring having rendered hauling very difficult and expensive. In consequence of these circumstances some mills were obliged to shut down early in the season, either from want of material to cut or water to run them, and the result of this state of matters was a diminished output, and the locking up of considerable capital in the unmanufactured logs.

The lumber trade of the year has been on the whole satisfactory, there was no period of inaction, sales were brisk and prices fairly remunerative, although, at the close of the year owing to a slight stringency, returns were not promptly obtainable. As regards waney and square pine, the early part of the season proved very dull and prices unsatisfactory, but towards the autumn prices stiffened and a healthier feeling prevailed. It is specially noteworthy in this connection that there is a smaller stock of these timbers wintering over in Quebec than has been the case for some years; so that a further stiffening of the market may be looked for.

Certain territory on the Muskoka and Petewawa waters having become dangerously exposed to fire through considerable settlement having taken place upon and contiguous to it, a sale was held of the more exposed portions aggregating an area of 459 square miles. The sale was well attended, representative lumber men from all parts of the Province and the United States being present. The prices obtained were highly satisfactory, being far in advance of those obtained at any previous sale. The 459

miles realized the sum of $1,313,755.50, which gives an average of $2,859.00 to the mile.

A considerable period having elapsed since the tariff of dues upon timber, etc., was framed, and standing timber having increased in value of late years, it was thought that such an increase in the dues ought to be made as would give the Province a share in the increment of value which had taken place; and it was accordingly decided to advance the rate of dues upon sawlogs from 75 cents per thousand to $1., or 33⅓ per cent., and upon square and waney timber from 1¼ cents per cubic foot to 2 cents, the ground rent being at the same time increased from $2 per mile to $3, all of which changes came into effect on the 1st of May last.

The forecast of the coming season is a slightly increased output of sawlogs and timber, with every prospect of good prices and an active demand.

FIRE RANGING.

The system of Fire Ranging, inaugurated in 1885, continues to give satisfactory results. The number of Fire Rangers in the field last season was fifty-five, as compared with forty-five in 1886, and thirty-seven in 1885. The cost of the service this year is $15,000, as compared with $9.847.75 in 1886, and $7,911 in 1885; these figures show an increased desire on the part of the licensees to avail themselves of the benefits of the service. The past season has been the most expensive so far, which is accounted for by its being a very dry one. Those engaged in the lumber trade report it as the driest and most dangerous season within recollection; Mr. William Mackey of Ottawa, an old and successful operator, reports that in his experience of forty-two years, he remembers nothing like it. As before reported, the Rangers are selected by the lumbermen, and, if approved, appointed by the Department, which pays them, collecting half the cost from the licensees at the end of the season. The staff selected in the way described has each year proved practical, prompt to act, and energetic in discharging its duties. The joint supervision by both the Department and the licensees ensures the utmost possible vigilance.

The Rangers have authority to call in assistance to prevent or subdue bush fires where necessary, paying for the same at fair wages. In 1885 and 1886 the expense incurred for assistance was not large, as fires were not numerous nor the seasons specially dry; this year is the first in which the fighting of fires has had to be systematically undertaken, and the organization has proved quite sufficient for the emergency. The Rangers have called on assistance wherever necessary, and gangs of men have battled with the "devouring element" day and night in various parts of the Province, and successfully stayed its progress in many instances; as many as 100 men, in addition to the regular Rangers, have been on duty at different periods; it is not, therefore, to be wondered at that the service has cost more than was estimated.

As the dry weather continued very late in the autumn, it was not possible to get all the accounts in, checked and paid, ere the close of the year, nor the refunds collected; $10,770.03 only of the cost appears in this year's Public Accounts, leaving $5,000 to be paid next year; to meet which, it is proposed to ask an increase of the estimate for this

service from $10,000 to $15,000. The net cost of the service to the Department will, however, be $7,500, the licensees refunding half as before stated.

In addition to protection of licensed lands it was arranged, last season and this to have the Rangers on limits adjacent to unlicensed Crown Lands, have a supervision over them, especially in the territory lately sold; the reports of the Rangers demonstrated the great danger to which the timber of the Crown was exposed, several fires having been prevented from spreading, which without such efforts might and probably would have destroyed millions of dollars worth of timber.

The settlers, I am glad to say, have as a rule shown themselves willing to assist in preserving the forest lands from fire, exercising more care than in the past, and assisting to suppress fires when called out by the Rangers.

At the close of each season it has been customary to enquire of the Licensees how many Rangers they had employed; how many fires had occurred; the quantity of timber damaged, or destroyed, and the amonnt of the loss actually sustained. Also the causes of the fires and what could be done to make the service more effective. I regret to say that the replies in 1885 and 1886 were not as full as could have been desired, but this year the questions were answered fully by nearly forty of the largest limit holders in the Province, from these it would appear the service is doing more than was expected. They report fifty-five Rangers employed; 110 distinct fires by which 200 millions of feet board measure of pine was badly injured, and place the actual loss at figures totalling $70,000.

There is no doubt that the presence of the Rangers, and the prompt and active measures taken by them, materially prevented, and substantially reduced the losses—not only so, but the Licensees were supplied with reliable information as to the quantity of timber damaged, its situation, and the force necessary to handle it this season before the grubs had time to seriously damage it, by which an enormous sum was saved to the Province and the Licensees.

The replies received all approve the service, and ask its continuance and extension; even those who have not taken advantage of it admit its value and good effect. The suggestions as to making the service more effective are, while not numerous, eminently practical. Those who have Rangers on their limits urge, with much fairness and force, that it should be made incumbent upon the tenure of a license to have the territory covered by it guarded by a Fire Ranger, as it frequently happens, they say, that bush fires break out on limits where there is no Ranger, and the Rangers on adjoining territory have to go there and battle with the fire to prevent it becoming uncontrollable, and spreading over on the limits of their employers. It is also suggested that settlements on pine lands should not be permitted, which, it may be stated, is not now allowed by the Department. Some other trifling suggestions are made, all in the direction of closer supervision, but none are of such a character as to require legislation, the present Fire Act giving ample authority to meet all the suggestions made.

The principal causes of fires are stated to be—want of care on the part of settlers clearing land, in setting fire to their choppings without respect to the surroundings, or

state of the weather, frequently doing so at an extremely dry time, and in a high wind—river drivers making fires for cooking, smudges, etc., and leaving them uncared for instead of extinguishing them—careless hunters, fishermen, tourists and explorers making fires in most dangerously inflammable localities, and going away, leaving them to be fanned into, perhaps, vast conflagrations, should a breeze spring up; and their throwing down, in dry brush or leaves, matches used in lighting a pipe, and in one instance, a considerable fire is stated to have arisen from a smouldering gun wadding. In one or two cases, sparks from locomotives are cited as a source of danger.

In conclusion, I desire to point out what a dangerous state of affairs is shewn to exist, and the consequent necessity for taking every step possible to reduce it to a minimum. When it is remembered that the careless throwing down of a match might cause millions of dollars worth of the timber wealth of the Province to vanish in smoke, the necessity is emphasized for disposing of Timber Berths as soon as danger is threatened by the advance of settlement, as by such sale the bonus is at any rate obtained, and a closer supervision had over them than the Crown could give.

The fires were confined to the eastern or settled portion of the Province, no fire of serious extent having been reported in Algoma, Thunder Bay or Rainy River Districts.

It is proposed to continue the service during the coming summer upon the same principles as heretofore, and to use every effort to make it successful.

FISHERIES.

The control and management of Fisheries in inland waters, having by "The Ontario Fisheries Act of 1885," been placed in charge of the Crown Lands Department, certain regulations were passed under the Act, copies of which were sent to every Crown Lands Agent, Forest and Fire Ranger, accompanied by requests that they would see the regulations were not contravened in their localities.

The reports from the Crown Lands Agents, etc., were too numerous to publish, but they go to show that the law was fairly observed in the waters under control of the Province.

The Revenue from permits, etc., amounted to $395.00.

The regulations, etc., and further particulars in connection with this service will be found in Appendices Nos. 11 to 15, at pages 18 to 23.

FREE GRANTS.

There are now 133 townships open for settlement under the "Free Grant and Homesteads Act," four new townships, viz., Conmee, Gillies, Lybster and O'Connor, all in the Thunder Bay District, having been added since my last report.

During the year just closed 902 locations were made for 122,772 acres of land, and 109 locatees purchased 5,694 acres. 549 patents were issued to locatees. (*See Appendix No. 10, page 14.*)

CROWN SURVEYS.

The following surveys have been carried out during the year :—The townships of Anglin, Edgar, and White, in the District of Nipissing, have been subdivided into farm lots of 100 acres each ; the townships of Brethour, Buck, Casey, Dymond, Garson, Harris, Harley and Hilliard, also in the Nipissing District, have been subdivided into farm lots of 320 acres each ; the townships of Foster, Hyman and Lumsden in the District of Algoma, have been subdivided into lots of 320 acres each.

The outlines of eight townships at the head of Lake Tamiscamingue on the Upper Ottawa, have been run. The running of these outlines has established the existence of an area of 1,000 square miles of good agricultural land, free from stone and with a clay soil, which lies between the boundary line between Ontario and Quebec and the Montreal River ; this land will be easy of access, as the River Blanche, a large river navigable for many miles from it mouth, flows through it.

A survey of the waters lying between Arrow Lake, in the District of Thunder Bay, and Hunter's Island, in the District of Rainy River, is in progress, and a base line to extend from the township of Strange in the District of Thunder Bay to Hunter's Island is also in progress ; these two surveys have been undertaken in view of the discovery of large mineral tracts in that region. There have been a few surveys of minor importance and the outlines of several timber berths in the Nipissing District have been run out. The returns of the above surveys have, so far as received, been examined and in most cases closed. The particulars of these surveys will be found in *Appendix No. 18, page 26.*

The Surveyor's Reports in relation to the surveys will be found in *Appendices Nos. 24 to 38, pages 35 to 52, inclusive.*

MUNICIPAL SURVEYS.

The Department has during the year issued instructions for three municipal surveys, which consisted of the surveys of certain lines, and the planting of durable monuments at the angles of certain lots in the townships of Artemesia, Maidstone and East Wawanosh. The particulars relating to these surveys will be found in *Appendix No. 17, page 25.*

MINERAL SURVEYS.

The General Mining Act requires that applicants to purchase mining lands in unsurveyed territory shall file surveyor's plans, field notes and descriptions of their locations in the Department before any sale is carried out. Under this statutory regulation a number of applicants in the Districts of Rainy River, Nipissing, Algoma and Thunder Bay have filed plans, etc., etc., and an area of 11,521 acres has been sold and patented to them. Particulars as to these surveys and sales will be found in *Appendices Nos. 20 and 21, pages 28 to 30.*

The Bureau of Statistics publishes in its Annual Report all the facts of interest in connection with mining operations in the Province, it having better facilities for collecting information on such matters than this Department. It will not be out of place, how-

ever, to state that important discoveries of gold have been made in the township of Denison, in the District of Algoma ; but until further developments have been made it is not possible to state the extent or value of the locality as a gold producing one. Large discoveries of iron ore have also been made at Gun Flint Lake, and north of it, in the District of Thunder Bay ; the ore is said to be very pure, the deposit being in the justly celebrated Vermillion Range, which here crosses into Canada from Minnesota.

COLONIZATION ROADS.

The work done during the year consisted of the construction of 200 miles of new roads and the repairing of 394 miles of old roads ; twenty new bridges were erected in various parts of the Province and twenty-five bridges were repaired ; the total expenditure on the service was $122,974.28. Owing to heavy floods in some localities and the prevalence of bush fires certain roads and bridges were so damaged as to be impassable, and the Department was obliged from these causes to make an expenditure beyond the appropriation voted of $5,424. The various inspectors report the work done throughout the Province to have been of a satisfactory character. *Appendix No. 39, pages 53 to 78.*

Respectfully submitted.

T. B. PARDEE,
Commissioner of Crown Lands.

Department of Crown Lands,
Toronto, 31st December, 1887.

RETURN of Officers and Clerks in the Department of Crown Lands, for the year 1887.

BRANCH.	Name.	Designation.	When Appointed.	Salary per Annum.	Remarks.
				$ c.	
	Hon. T. B. Pardee	Commissioner	1873, December 4	4,000 00	
	Thos. H. Johnson	Assistant Commissioner	1869, August 21	2,800 00	Died 8th January, 1887.
	Aubrey White	Assistant Commissioner	1882, January 1	2,600 00	
	George Kennedy	Law Clerk	1872, February 1	2,000 00	
	J. I. McIntosh	Shorthand Writer and Clerk	1886, August 1	1,200 00	
Free Grants and Sales	A. Kirkwood	Chief Clerk	1854, March 21	1,900 00	
	J. M. Grant	Clerk	1860, May 12	1,300 00	
	J. F. Murphy	Clerk in Charge of Free Grants	1872, May 1	1,250 00	
	Julian Sale	Clerk	1871, August 5	850 00	
	E. F. Stow	Clerk	1878, March 1	700 00	
Surveys, Patents and Roads	G. B. Kirkpatrick	Chief Clerk	1866, January 30	1,900 00	
	W. Revell	Clerk	1871, October 2	1,150 00	
	W. F. Lewis	Clerk	1872, February 5	850 00	
	E. Fox	Chief Clerk Patents	1857, September 28	1,400 00	Resigned 30th June, 1887.
	A. J. Taylor	Chief Clerk Patents	1872, October 1	1,200 00	
	P. Alma	Clerk	1871, August 1	1,000 00	
	Hy. Smith	Superintendent of Colonization Roads	1881, January 1	1,800 00	
	C. Cashman	Clerk	1872, September 1	1,150 00	
Woods and Forests	G. B. Cowper	Chief Clerk	1857, October 14	2,000 00	
	Th. E. Johnson	Clerk	1874, January 1	1,800 00	
	J. A. G. Crozier	Clerk	1867, December 1	1,200 00	
	J. Durkin	Clerk	1884, August 22	1,100 00	
	H. R. Hardy	Clerk	1883, November 1	900 00	

APPENDIX No. 1.—*Continued.*

RETURN of Officers and Clerks in the Department of Crown Lands, for the year 1887.

BRANCH.	Name.	Designation.	When Appointed.	Salary per Annum.	Remarks.
				$ c.	
Accounts	D. G. Ross	Accountant	1861, April 15	1,700 00	
	R. H. Browne	Chief Clerk, Agents' Returns	1862, May 14	1,300 00	
	C. P. Higgins	Clerk	1873, July 1	850 00	
	E. Leigh	Clerk	1873, December 20	850 00	
	J. Morphy	Registrar	1851, June 1	1,600 00	
	J. Bradshaw	Office Keeper	1852, March 27	500 00	
	A. Macdonald	Messenger	1862, May 19	550 00	
	R. Burroughes	Fireman	1868, June 1	550 00	
	D. Kinnan	Night Watchman	1873, September	500 00	

D. GEORGE ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 2.

List of Crown Land Agents for the Disposal of Free Grants, 1887.

Name.	District or County.	Date of Appointment.	Salary per Annum.	REMARKS.
			$ c.	
Anderson, D.	Part of Peterborough	1870, November 21	500 00	
Best, S. G.	" Parry Sound District	1875, March 23	500 00	
Brown, C. P.	" Algoma District	1872, June 25	500 00	
Cockburn, J. D.	" Nipissing District	1884, May 21	500 00	Agent for sale of lands.
Day, J. F.	" Algoma District	1875, July 19	500 00	
Dawson, G. W.	" Frontenac and Addington	1882, February 17	500 00	
Duncan, A. G.	St. Joseph Island	1883, December 23	200 00	
Fielding, W.	Part of Victoria	1882, February 23	500 00	
Frood, Th.	" Algoma	1886, May 21	500 00	
Gilligan, B. J.	" Nipissing District	1884, March 26	500 00	
Handy, E.	" Parry Sound District	1879, January 3	500 00	
Kennedy, J. D.	" Renfrew	1885, October 30	500 00	
Mackay, T.	" Parry Sound District	1881, December 5	500 00	
Macpherson, R.	" Frontenac	1871, July 18	500 00	Agent for sale of lands.
Margach, W.	" Thunder Bay District	1886, August 31	250 00	do do do
Nichols, W. L.	" Algoma District	1885, August 27	500 00	
Reeves, J.	" Nipissing District	1872, February 12	500 00	
Scarlett, J. S.	" Parry Sound District	1880, June 17	500 00	
Stewart, C. R.	" Hastings and Peterborough	1882, May 1	500 00	
Tait, J. R.	" Hastings	1869, May 28	500 00	
Taylor, T. C.	" District of Muskoka	1881, December 15	500 00	
Whelan, J.	" Renfrew	1884, September 19	500 00	

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

Department of Crown Lands,
Toronto, 31st December, 1887.

APPENDIX No. 3.

STATEMENT of Acres of Land Sold, Amount of Sales and Amount of Collections for the Year 1887.

SERVICE.	Acres Sold.	Amount of Sales.	Amount of Collections.
		$ c.	$ c.
Clergy Lands	1,585	1,682 60	7,433 70
Crown Lands	67,314½	76,837 26	74,493 69
Common School Lands	292½	619 75	17,489 93
Grammar School Lands	605	556 00	3,184 06
Total	69,797	$79,695 61	$102,601 38

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 4.

STATEMENT of the Collections of the Crown Lands Department for the year 1887.

SERVICE.	$ cts.	$ cts.
Land Collections.		
Crown Lands	74,493 69	
Clergy Lands	7,433 70	
Common School Lands	17,489 93	
Grammar School Lands	3,184 06	
Rent	111 00	
In Suspense	18,267 53	
		120,979 91
Woods and Forests.		
Timber Dues	508,601 88	
Ground Rent	58,213 75	
Bonus	424,039 80	
		990,855 43
Casual Fees		481 00
Surveyors' Fees		257 90
Fisheries		395 00
Expenditure Refunds.		
Surveys	2,585 02	
Forest Fire Prevention	801 00	
Destitute Settlers	550 84	
Settlers' Homestead	109 18	
Inspection	143 26	
Colonization Roads	1,734 28	
		5,923 58
		$1,118,892 82

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 5

STATEMENT of the Receipts of the Department of Crown Lands, which are considered as Special Funds.

SERVICE.	$ cts.	$ cts.
Clergy Lands.		
Principal	4,237 36	
Interest	3,196 34	
		7,433 70
Common School Lands.		
Principal	8,150 75	
Interest	9,339 18	
		17,489 93
Grammar School Lands.		
Principal	2,491 48	
Interest	692 58	
		3,184 06
		$28,107 69

D. GEO. ROSS,
Accountant.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 6.

STATEMENT of the Gross Disbursements of the Department of Crown Lands for the Year 1887.

SERVICE.	$ c.	$ c.	$ c.
AGENTS' SALARIES AND DISBURSEMENTS.			
Salaries.—Land.			
Anderson, D	500 00		
Best, S. G	500 00		
Brown, C. P	500 00		
Cockburn, J. D	500 00		
Dawson, G. W	500 00		
Day, J. F	500 00		
Duncan, A. G	200 00		
Frood, T	500 00		
Fielding, W	500 00		
Gilligan, B. J	500 00		
Handy, E	500 00		
Kennedy, J. D	500 00		
Mackey, T	500 00		
Macpherson, R	500 00		
Margarch, W	250 00		
Nichols, W. L	500 00		
Reeves, J	500 00		
Scarlett, J. S	500 00		
Stewart, C. R	500 00		
Tait, J. R	500 00		
Taylor, T. C	500 00		
Whelan, J	500 00		
		10,450 00	
Salaries.—Timber.			
Campbell, P. C	1,600 00		
Johnson, T. E	133 33		
Macdonald, W. J	250 00		
Macdonald, D. F	1,466 67		
Margach, W	1,000 00		
McWilliams, J. B	2,000 00		
Tassé, D	100 00		
Way, J. F	1,440 00		
		7,990 00	
Agents' Disbursements.			
Anderson D	19 82		
Best, S. G	24 28		
Brown, C. P	4 75		
Cockburn, J. D	37 98		
Day, J. F	7 70		
Duncan, A. G	8 60		
Fielding, W	5 00		
Frood, T	9 93		
Handy, E	30 63		
Gilligan, B. J	6 25		
Johnson, T. E	31 50		
Kennedy, J. D	9 57		
Mackey, T	17 09		
Macpherson, R	8 25		
Macdonald, D. F	232 80		
Margach, W	935 50		
McWilliams, J. B	303 99		
Nichols, W. L	15 66		
Poupore, J	558 70		
Scarlett, J. S	14 86		
Stewart, C. R	16 39		
Taylor, T. C	41 26		
Way, J. F	133 80		
Whelan, J	3 56		
		2,477 87	
Miscellaneous.			
Bruce, J., Inspection	50 00		
Henderson, J., do	45 00		
Johnson, T. E., travelling expenses	264 95		

APPENDIX No. 6—*Continued.*

STATEMENT of the Gross Disbursements of the Department of Crown Lands for the Year 1887.

SERVICE.	$ c.	$ c.	$ c.
Miscellaneous—Continued.			
Kennedy, Geo., travelling expenses	13 00		
Shaw, J., Inspection	177 10		
Sime, P. M. do	53 10		
Stephens, H.H. do	25 00		
White, Aubrey, travelling expenses	122 00		
Willmott, J. H. do	26 25		
Williamson, W. D., Inspection	11 75		
		788 15	
			21,706 02
Wood Ranging and Inspection of Timber Lands.			
Alley, E		246 00	
Bick, Geo		974 08	
Brady, Jno		1,015 00	
Brennan, P		690 00	
Campbell, P. C		228 36	
Cunningham, Jno		593 10	
Dulmage, A. F		1,350 00	
Halliday, F		1,528 40	
Halliday, J		770 00	
Hutton, J		177 00	
Johnson, S. M		1,442 68	
Kennedy, Jno		1,549 09	
Kirkpatrick, W. R		62 00	
Ludgate, T		1,050 00	
Mackay, Jno		50 00	
Moore, D. H		1,069 55	
McCogherty, P		1,055 17	
McDonald, D. F		200 00	
McFarlane, D		84 00	
McGown, T		306 25	
McGown, W		1,215 00	
Paget, G		1,081 53	
Regan, Jno		1,073 80	
Russell, W		1,544 26	
Shaw, Jos		1,453 48	
Smith, J. W		1,042 75	
Turgeon, J. B		615 00	
Wood, D		164 00	
			22,630 50
Forest Fire Prevention.			
Blanchet, O		182 00	
Borron, E		308 00	
Bradley, P		370 50	
Bremner, W		260 05	
Brennan, J		550 00	
Bromley, T		320 00	
Brown, L		203 00	
Campbell, D		45 00	
Cochrane, J		254 00	
Conway, J		246 00	
Coghlin, J		117 25	
Donally, R. S		317 20	
Fraser, A		545 00	
Gague, F		337 14	
Garvey, P		300 50	
Graham, J		234 00	
Haley, C		272 00	
Harris, Jno		134 00	
Humphreys, J. G		172 00	
Johnson, R		158 00	
Johnson, E		290 63	
Labrash, J		198 00	
Mitchell, J		257 00	

APPENDIX No. 6—*Continued.*

STATEMENT of the Gross Disbursements of the Department of Crown Lands for the Year 1887.

SERVICE.	$ c.	$ c.	$ c.
Forest Fire Prevention—Continued.			
McCallum, A.		264 00	
McDermott, P		200 00	
McDonald, J.		390 50	
McLaren, F.		214 00	
McNabb, W. C.		418 50	
Parcher, A		260 00	
Playfair, E.		226 00	
Sage, N.		172 00	
Scantlin, J		323 51	
Sedgwick, J.		554 25	
Vannier, N		308 00	
Watson, W.		156 00	
Whyte, J. F. G		454 00	
Wilson, A.		290 00	
Wyllie, W. A		168 00	
Young, W.		300 00	
			10,770 03
McGown, T., Special Timber Inspection			360 00
Refunds			12,092 88
Colonization Roads			124,709 06
Surveys			39,473 25
Board of Surveyors			400 00
Contingencies.			
Printing and binding		1,299 56	
Stationery		1,911 12	
Postage and telegraphing		1,061 03	
Extra Clerks		1,520 00	
Office-keeper		500 00	
Messenger		550 00	
Night Watchman		500 00	
Fireman		550 00	
Extra Messenger and Fireman		497 50	
Subscriptions and advertising		993 70	
Sundries		208 85	
			9,591 76
			241,733 50

AUBREY WHITE,
Assistant Commissioner.

D. GEORGE ROSS,
Accountant.

DEPARTMENT OF CROWN LANDS,
Toronto, Dec. 31st, 1887.

APPENDIX No. 7

Woods and Forests.

Statement of Revenue Collected during the Year ending 31st December, 1887.

	$ c.	$ c.
Amount of Ottawa collections, John Poupore	230,953 78	
" " H. J. Chaloner	27,784 95	258,738 73
Amount of Belleville collections, J. F. Way	93,608 00	
" " H. J. Chaloner	421 50	94,029 50
Amount of Western Timber District collections at Department	622,712 73	
" " " H. J. Chaloner	15,374 47	638,087 20
Total		990,855 43

AUBREY WHITE,
Assistant Commissioner.

G. B. COWPER,
Chief Clerk in Charge.

Department of Crown Lands,
Woods and Forests Branch,
Toronto, 31st December, 1887.

APPENDIX No. 8.

List of Crown Timber Agents in the Province of Ontario, their Assistants, Names of Territories, Residences, Dates of Appointments, and Salary allowed to each for his services, during the year ending 31st December, 1887.

Names of Territories.	Names of Agents and Assistants.	Residence.	Date of Appointment.	Salary per Annum up to 1st July, '73.	Salary per Annum from 1st July, '73.	Remarks.
				$ c.	$ c.	
Upper Ottawa	John Poupore	Ottawa City				
	C. S. McNutt, Assistant	"	1858, April 13	1,400 00	1,800 00	The Crown Timber Office, Ottawa, acts for the Provinces of Ontario and Quebec, and also for the Dominion of Canada, in the collection of slide dues; the proportion of salaries chargeable to each Province and the Dominion not yet determined.
	J. Ritchie, Clerk	"	1864, June 23	1,000 00	1,400 00	
	A. J. Russell, jr., Draughtsman	"	1867, April 1	700 00	1,200 00	
	E. T. Smith, Clerk	"	1864, June 23	650 00	1,000 00	
	J. Jackson, Messenger	"	1871, August 1	300 00	300 00	
	W. J. Macdonald, Deputy Slide Master and Chief Timber Counter.	"	1882, August 18		*	Additional to his salary from the Department of Public Works, Ottawa.
	James Steen, Timber Counter	"	1861, May 27	$2 per diem.	$2 per diem.	During season of Navigation.
	John Redmond, Assistant, and Boatman	"	1872, March 1	"	"	" "
Belleville Agency	Joseph F. Way, Agent	Belleville	1854, May 6	1,440 00	1,440 00	
Collector at Quebec	H. J. Chaloner, Acting Agent	Quebec				The remarks in connection with the Crown Timber Office at Ottawa respecting salaries, apply to the Collector's Office at Quebec.
	Henry John Miller, Assistant	"	1883, September 13		1,200 00	
	William Miller, Clerk	"	1872, November 7.	1,000 00	1,000 00	

*The Local Governments of Ontario and Quebec have each paid Deputy Slide-master up to 31st December, 1883, $150 per annum in addition to the amount paid by Public Works. Allowance by the Provincial Governments increased to $250 each, per annum, from 1st January, 1884.

G. B. COWPER, Chief Clerk in Charge,

AUBREY WHITE,

Assistant Commissioner.

Department of Crown Lands, Woods and Forests Branch,
Toronto, 31st December, 1887.

APPENDIX

WOODS AND

STATEMENT of Timber and Amounts accrued from Timber Dues, Ground

QUANTITIES AND DESCRIP-

AGENCIES.	Area covered by Timber Licenses.	Saw Logs. (A Standard is 200 feet B. M.)				Oar Logs.
		White Pine.		Other.		
	Square miles.	Pieces.	Standards.	Pieces.	Standards.	Pieces.
Ottawa Timber District...	6,698	2,072,349	1,340,765	10,607	4,181	183
Belleville Timber District..	1,224	804,675	452,260	19,701	7,767	.....
Western Timber District..	7,828	1,773,234	1,045.991	537	217	.....
Total.....	15,850	4,650,258	2,839,016	30,845	12,165	183

GENERAL STATEMENT OF

AGENCIES.	Railway Ties.	Hemlock.		Cordwood.		Fence Rails.	Pile Timber.	Telegraph Poles.	Traverses.	Lineal feet Cedar.
	Pieces.	Pieces.	Feet.	Hard Cords.	Soft Cords.	No.	Feet B. M.	No.	Pieces	Feet.
Ottawa Timber District.	85,043	.....	.....	122	817	.....	.....	140	2942	183,701
Bellville Timber Timber.	43,581	837	34,280	158	62	.....	.....	365	.....	202,539
Western Timber District.	647,518	.....	.....	2,388	44,713	1,690	6,765,244	2,439	214	.....
Total	776,142	837	34,280	2,668	45,592	1,690	6,765,244	2,944	3156	386,240

G. B. COWPER,
Chief Clerk in Charge,

DEPARTMENT OF CROWN LANDS, WOODS AND FORESTS BRANCH,
TORONTO, 31st December, 1887.

No. 9.

FORESTS.

Rent and Bonus during the year ending 31st of December, 1887.

TION OF TIMBER.

Square Timber.				Boom and Dimension Timber.		Elm, Ash, Spruce Maple, Birch and White Wood.			Oak.		Tamarac.	
White Pine.		Red Pine.										
Pieces,	Feet.	Pieces.	Feet.	Pieces.	Standards.	Pieces.		Feet.	Pieces	Feet.	Pieces	Feet.
15,322	793,301	10,657	423,796	79,712	70,328	E. 117 M. 4 A. 4		1,970 79 157	8	137	199	4,061
2,079	91,388	.....	.....	15,660	16,978	E. 13 B. 1 A. 1		485 30 31	....	.....	113	3,758
20,448	1,128,498	853	37,407	51,916	68,778	A.	6	256	2	59	2	56
37,849	2,013,187	11,510	461,203	147,288	156,084	E. 130 M. 4 B'ch 1 A. 11		2,455 79 30 444	10	196	314	7,875

TIMBER, Etc.—*Continued.*

Cedar Posts.	Cords Bolts.	Spruce Spars.	Binders	Lineal feet Hemlock and Spruce	Amounts Accrued.				
Cords.	No.	No.	No.	Feet.	Interest, Trespass, etc.	Timber Dues.	Ground Rent.	Bonus.	Total.
					$ c.	$ c.	$ c.	$ c.	$ c.
.....	361	26	140	.....	1,452 17	230,000 60	21,448 00	.....	252,900 77
1,734	15	.....	.....	1,449	1,647 22	75,148 86	5,421 00	59 58	82,276 66
1,058	2728	.....	.....	.....	12,113 31	216,913 72	30,081 75 * 1,251 00	25,272 86 * 398,707 36	684,340 00
2,792	3104	26	140	1,449	15,212 70	522,063 18	58,201 75	424,039 80	1,019,517 43

* Ground rent and bonus of sale of 15th December, 1887.

AUBREY WHITE,
Assistant Commissioner.

APPENDIX No. 10.

RETURN of the number of locatees and of acres located; of purchasers and of acres sold; of lots resumed for non-performance of settlement duties, and of patents issued under the "Free Grants and Homesteads Act" during the year 1887.

TOWNSHIP.	DISTRICT OR COUNTY.	AGENT.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots, the locations of which have been cancelled.	Number of patents issued.
Baxter	Muskoka	Theo. C. Taylor, Bracebridge.	2	259	.....	.....	1	.....
Brunel			3	346	.....	.....	5	8
Chaffey			5	600	.....	.....	6	5
Draper			10	1,044	.....	.....	9	2
Franklin			6	575	2	147	2	14
Macaulay			2	402	.....	.....	4	8
Medora			8	1,146	2	51	9	7
Monck			5	615	.....	.....	6	3
Morrison			5	635	.....	.....	2	1
Muskoka			3	437	.....	.....	4	1
McLean			5	770	1	111	8	2
Oakley			6	757	1	26	6	4
Ridout			4	362	.....	.....	1	1
Ryde			5	606	.....	.....	6	10
Sinclair			11	1,532	2	46	7	16
Sherborne			.....	.....	.....	.....	.....	.....
Stephenson			6	766	1	31	8	5
Stisted			5	554	.....	.....	3	15
Watt			10	1,152	1	146	8	3
Wood			6	675	3	117	5	9
Cardwell	Parry Sound	Mrs. T. Mackay, Parry Sound	4	500	.....	.....	7	6
Carling			11	1,801	.....	.....	6	4
Christie			3	398	2	108	4	3
Fergusson			2	301	.....	.....	4	1
Foley			5	964	.....	.....	9	2
Hagerman			2	302	.....	.....	1	2
Humphry			3	344	2	132	6	5
Monteith			4	508	.....	.....	4	6
McConkey			.....	.....	.....	.....	.....	.....
McDougall			3	561	.....	.....	6	2
McKenzie			1	180	.....	.....	1	3
McKellar			3	600	1	98	3	3
Shawanaga			6	809	.....	.....	.....	.....
Wilson			.....	.....	.....	.....	.....	.....

Armour	Parry Sound	E. Handy, Emsdale	16	2,344	2	200	14	23
Bethune			7	1,275	3	18	7	8
Joly			20	3,452	2	4	15	1
McMurrich			19	3,040	5	22	19	21
Perry			12	1,607	1	84	18	84
Proudfoot			13	2,270	.....	.....	6	2
Chapman	Parry Sound	S. G. Best, Maganetawan	6	1,062	2	56	5	9
Croft			4	452	1	110	9	7
Ferrie			2	398	.....	.....	.....	2
Gurd			5	1,003	2	3	.....	3
Lount			8	1,054	1	1	4	2
Machar			14	2,091	6	204	11	10
Mills			9	1,418	1	10	5	.....
Pringle			2	409	1	9	.....	.....
Ryerson			7	1,200	.....	.....	1	15
Spence			7	1,011	.....	.....	14	20
Strong			6	1,090	1	1	7	18
Hardy	Parry Sound	J. S. Scarlett, Nipissing	.....	.....	.....	.....	.....	.....
Himsworth			35	6,420	3	250	32	14
Laurier			19	3,335	1	18	5	2
Nipissing			13	1,987	2	200	4	15
Patterson			.....	.....	.....	10	.....	1
Anson	Haliburton	Wm. Fielding, Minden	1	100	2	55	.....	4
Glamorgan			15	2,055	.....	.....	7	9
Hindon			.....	.....	.....	.....	1	.....
Lutterworth			6	518	.....	.....	6	4
Minden			5	600	.....	.....	7	4
Stanhope			3	259	.....	.....	.....	4
Snowdon			7	796	.....	.....	6	3
Anstruther	Peterboro'	D. Anderson, Apsley	2	185	.....	.....	1	.....
Chandos	do		13	1,757	2	39	8	3
Cardiff	Haliburton		11	1,526	.....	.....	11	5
Monmouth	do		18	1,973	1	5	17	4
Galway	Peterboro'	C. R. Stewart, Haliburton	12	1,206	1	9	5	2
Bangor	Hastings		3	288	.....	.....	2	.....
McClure	do		.....	.....	.....	.....	.....	.....
Wicklow	do		.....	.....	.....	.....	.....	.....
Carlow	Hastings	J. R. Tait, L'Amable	3	500	.....	.....	2	.....
Cashel			2	300	.....	.....	2	2
Dungannon			10	1,205	.....	.....	2	3
Faraday			20	3,204	3	301	9	7
Herschel			6	828	2	135	2	2
Limerick			9	1,192	1	42	8	2
Mayo			2	273	.....	.....	3	3
Monteagle			10	928	1	47	2	1
Wollaston			2	126	.....	.....	2	7

APPENDIX No. 10.—*Continued.*

RETURN of the number of locatees and of acres located, etc.

TOWNSHIP.	DISTRICT OR COUNTY.	AGENT.	Number of persons located.	Number of acres located.	Number of purchasers.	Number of acres sold.	Number of lots, the locations of which have been cancelled.	Number of patents issued.
Abinger	Addington	G. W. Dawson, Plevna	5	700	.....	.....	4	1
Denbigh	do		12	1,518	5	12	4	2
Canonto, South	Frontenac		1	200	.....	.....	2	5
do North	do		.....	.....	.....	.....	.....	.....
Clarendon	do		14	1,548	2	280	12	8
Miller	do		8	982	.....	.....	5	2
Palmerston	do		13	1,810	3	110	5	8
Algona, North	Renfew	Jas. Reeves, Eganville	.....	.....	.....	.....	.....	1
do South			6	636	1	52	5	5
Brougham			.....	.....	.....	.....	.....	.....
Grattan			4	339	2	134	3	3
Hagarty			9	999	1	11	4	6
Richards			1	92	.....	.....	.....	2
Wilberforce			2	200	2	102	.....	7
Brudenell	Renfrew	John Whelan, Brudenell	11	1,128	.....	.....	4	5
Griffith			.....	.....	.....	.....	.....	1
Lyndoch			6	810	.....	.....	1	2
Matawatchan			9	1,036	.....	.....	3	1
Radcliffe			2	384	.....	.....	.....	6
Raglan			7	1,000	.....	.....	.....	1
Sebastopol			7	864	1	75	4	1
Sherwood			4	551	1	49	2	.....
Alice	Renfrew	J. D. Kennedy, Pembroke	7	694	.....	.....	.....	3
Buchanan			13	1,347	3	245	8	3
Fraser			.....	.....	.....	.....	.....	.....
Head			2	257	.....	.....	.....	.....
Maria			1	97	.....	.....	.....	.....
McKay			.....	.....	.....	.....	.....	.....
Petewawa			12	1,422	.....	.....	10	3
Rolph			2	299	.....	.....	.....	.....
Wylie			3	247	.....	.....	.....	1
Pembroke & Mattawan Road			.....	.....	.....	.....	.....	.....

Bonfield	Nipissing	B. J. Gilligan, Mattawa	30	3,197	6	472	5	1
Calvin			23	2,854	6	498	10	.....
Ferris			34	4,790	5	313	14	.....
Mattawan			2	299	.....	.....	2	.....
Papineau			13	1,300	.....	.....	10	.....
Aweres	Algoma	C. P. Brown, Sault Ste. Marie	.....	.....	.....	.....	.....	.....
Korah			1	160	1	160	1	4
Prince			8	1,184	.....	.....	3	5
Parke			2	238	2	135	2	.....
Plummer	Algoma	J. F. Day, Bruce Mines	.....	.....	.....	.....	.....	7
St. Joseph Island	Algoma	A. G. Duncan, Marksville	26	2,711	1	2	24	21
Blake	Thunder Bay	Wm. Margach, Port Arthur	4	640	.....	.....	.....	.....
Conmee			2	330	.....	.....	.....	.....
Crooks			.....	.....	.....	.....	.....	.....
Dawson Road			.....	.....	.....	.....	.....	.....
Gillies			8	1,177	.....	.....	.....	.....
Lybster			1	161	.....	.....	.....	.....
Oliver			20	3,100	1	159	18	3
O'Connor			.....	.....	.....	.....	.....	.....
Paipoonge			29	4,233	1	39	19	.....
		Total	902	122,772	109	5,694	612	549

JOSEPH J. MURPHY,
Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

Department of Crown Lands,
Toronto, 31st December, 1887.

APPENDIX No. 11.

FISHERIES.

COPY OF AN ORDER IN COUNCIL, APPROVED BY HIS HONOUR THE LIEUTENANT-GOVERNOR, THE 26TH DAY OF MAY, A.D. 1887.

Upon the recommendation of the Honourable the Commissioner of Crown Lands, the Committee of Council advise, that the accompanying regulations under "The Ontario Fisheries Act, 1885," be approved of and established by Your Honour.

Certified,

J. LONSDALE CAPRÉOL,
Asst. Clerk Executive Council,
Ontario.

The Honourable
THE COMMISSIONER OF CROWN LANDS.

The Commissioner of Crown Lands has the honour to recommend to the Executive Council that the following regulations be made under "The Ontario Fisheries Act, 1885," namely:—

1. That leases granted for the purpose of conveying the fishing rights pertaining to public lands adjoining the rivers, streams and lakes of the Province, shall be for the depth of one chain inland from the water's edge.

2. Such leases shall be granted as far as practicable to responsible parties, able and willing to improve the lakes and rivers and guard them well. Applicants having in view the personal use and enjoyment of the fishing rights to be generally preferred to such as may offer higher rents with a view to farming or sub-letting the right to fish. Care to be taken that residents in the Province be allowed to enjoy a due proportion of the fishing rights.

3. That the valuation of the lands for rent shall be based on the character and condition of the rivers, streams and lakes which they adjoin, as made known to the Department of Crown Lands by reports of official Inspectors or private individuals, all such reports to be considered confidential, and not to be communicated to other parties without the express authorization of the Commissioner of Crown Lands. Offers made by applicants for leases not to be communicated to other applicants.

4. That leases of lands made and granted under the provisions of "The Ontario Fisheries Act," shall not be held to convey the right to work any mine that may be found on such lands, or to cut any timber thereon.

5. That licenses and permits to fish shall be granted upon the payment in advance of such fees as the Commissioner of Crown Lands may from time to time determine, and shall be valid until the close of the angling season of the year in which it is granted.

6. That excessive or wasteful fishing or killing of fish shall involve the cancellation of the lease, license or permit covering the waters in which it has taken place.

7. That it be obligatory upon any person who has no domicile in the Province of Ontario, and who desires to fish in the rivers, streams or lakes under the control of the Province, to procure a permit or license to that effect from the Commissioner of Crown Lands before beginning to fish.

8. That no person shall, except under authority of a fishery lease, fishing license or permit, fish for, catch or kill any fish in any inland lake, river or stream adjoining the ungranted lands of the Province.

9. That no person shall, without lawful authority, fish for, catch or kill, by any device or means, any fish during their spawning time, or disturb or destroy their spawn or spawning-beds.

10. That it shall not be lawful to fish for, catch or kill brook trout, salmon trout, white fish, bass, pike, pickerel, maskinongé, tulibee, grayling, herring or perch, in any inland lake, river or stream under the control of the Province, by any device or means other than by hook and line, or angling, except in waters leased or licensed for the express purpose of net-fishing.

11. That it shall not be lawful to use any explosives, or chemical material, or compound, for the purpose of killing or catching fish.

12. That fishing by torch-light, or other artificial light placed in or above the water, is prohibited.

13. That no person shall fish for, catch, kill, buy, sell, or have in possession any fish at times when the taking or killing of fish is prohibited by lawful authority.

14. That parties holding leases under the provisions of "The Ontario Fisheries Act" shall not have any recourse against the Government of the Province for any hindrance to their use and enjoyment of the fishing rights pertaining to the lands leased, by the operation of any law enacted or that may be hereafter enacted by the Parliament of Canada, or by any action of the Government of Canada, or any person employed thereunder.

15. It shall not be lawful to use or set in any of the inland rivers, streams or water courses within the Province, any net, rack, trap, weir or obstruction for the purpose of catching fish, or whereby the free passage of fish up and down the same may be obstructed or prevented.

16. The catching, killing or molesting of fish when passing or attempting to pass through any fishway or fish-pass, or in surmounting any obstacle or leaps, the use of any invention to catch, kill or molest fish in the mill-heads and water-courses appurtenant thereto, are hereby forbidden.

17. It shall not be lawful to put into any waters in any inland river, stream or lake in the Province where fish are taken, any offal, blood, putrid brine, putrid fish or other deleterious substance, and all fish offal or filth of any description whatsoever accruing from the catching and curing of fish, shall be burned or buried twenty yards distant from the water's edge of said river, stream or lake.

Close Seasons.

It shall not be lawful to fish for, catch, kill or have in possession :
Speckled Trout, between the 15th September and 1st May.
Pickerel (Doré), between the 15th April and 15th May.
Bass and Maskinongé, between the 15th April and 15th June.
White Fish and Salmon Trout, between the 1st November and 30th November.

T. B. PARDEE,
Commissioner of Crown Lands.

Department of Crown Lands,
Toronto, 5th May, 1887.

APPENDIX No. 12.

FISHERY OVERSEERS,

UNDER THE ONTARIO FISHERIES' ACT.

NAME.	DISTRICT.	POST OFFICE ADDRESS.	SALARY.
Newton Flanagan	River Nepigon, Lake Nepigon and adjacent waters	Red Rock	$50 00
John H. Wilmot	District of Muskoka	Beaumaris	50 00
Francis James Moore	County of Peterborough, Provisional County of Haliburton, and that part of the County of Victoria south of the District of Muskoka.	Lakefield	50 00

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, December 30th, 1887.

APPENDIX No. 13.

Red Rock, Nepigon River,
16th December 1887.

The Honourable
The Commissioner of Crown Lands,
Toronto.

Sir,—I beg most respectfully to submit my report, as Fishery Overseer for River and Lake Nepigon and adjacent inland waters, for the past season.

The only mode of fishing that has been carried on here was by angling with artificial fly, or by hook and line with bait, more particularly the former, indeed, almost entirely so; no attempt has been made to fish with nets or other means for the purpose of sale or profit, and no destruction of fish by any illegal methods has taken place; the laws and regulations have been generally well observed by anglers, who have, during the past season, visited these waters.

A greater number than for some years past visited the Nepigon this last season for the purpose of angling; all duly made application for and were granted special permits in accordance with instructions from your department; one hundred and two (102) persons made application for and received special permits to fish; of this number, seventy-three were issued to residents of the United States, two to gentlemen from England, and twenty-seven to inhabitants of our own Province. The sum of three hundred and seventy-five dollars ($375.00) was collected for permits issued, all of which, along with statements, permit books, etc., have been forwarded to the Department at Toronto.

The varieties of fish found in River and Lake Nepigon comprise principally, brook or speckled trout, which run to a large size, up to seven pounds in weight, and are of a splendid quality, frequenting mostly the pools at or below the many rapids on the stream, as well as in all streams flowing into the large Lake Nepigon. Lake trout are found in abundance in Lake Nepigon, and also frequent the lake-like stretches of the river. White fish abound in all of these waters; other varieties, such as pickerel, perch and jackfish or pike, are found in different localities, more so about the mouth of the river and out-lying waters.

I have every reason to believe that each succeeding year will see an increased number of anglers coming to the Nepigon, and I know it is the earnest wish of every gentleman who loves to cast a fly, that your Government would jealously guard this noble and beautiful stream from the nets, etc. of the spoiler.

With the greatest respect,
Your obedient servant,

(Signed) NEWTON FLANAGAN,
Fishery Overseer.

APPENDIX No. 14.

BEAUMARIS, 15th December, 1887.

To the Honourable
COMMISSIONER OF CROWN LANDS,
Toronto.

SIR,—I have the honour to transmit to you my annual report respecting the fisheries in the district over which I am overseer.

During the past season anglers as a rule have met with fair success, but the supply of bass and pickerel does not come up to that of a few years ago; this is accounted for by the yearly increase of visitors to this District.

The practice of netting is on the decrease, and my confiscation of several nets has been the means of stopping many who formerly were in the habit of using them. Spearing on the spawning beds is one of the greatest sources of destruction of fish; this mode of obtaining fish is of rare occurence on Lakes Muskoka, Rousseau and St. Joseph, but is practised to some extent on Trading, Peninsula, Mary, Fairy and Vernon Lakes, and in most warters where salmon trout are plentiful, and although I have been most anxious to secure a conviction and have spent many nights on the lakes for that purpose, I regret to say I have been unsuccessful.

Mlll owners, as a rule, are now using all necessary precautions to prevent the escape of saw-dnst and mill rubbish into the lakes and rivers.

The seasons for taking fish are fairly observed, with the exception of those who make a practise of spearing. The varieities mostly destroyed by this means are salmon trout, speckled trout and white fish. I may mention that the varieties of fish met with in this District are:—

Lakes Muskoka, Rousseau, Joseph and adjacent waters—Bass, pickerel, salmon trout, white fish, herring and perch.

Lakes Vernon, Fairy, Peninsula and Mary, principally salmon trout.

Trading Lake—Salmon trout and speckled trout.

Moon and Musquash Rivers and coast of Georgian Bay—Bass, pickerel and maskinongé.

All the inland waters in this district are invested with suckers and ling, which, during the spawning season, feed principally upon the spawn of other fish.

To look after the fisheries of this district thoroughly would occupy one's entire time and would consequently incur considerable expense. My object has been to endeavour to put down existing evils, at the same time incurring as little expense as possible.

I am, Sir,

Your obedient servant,

(Signed) JOHN H. WILLMOTT.

APPENDIX No. 15.

LAKEFIELD, 28th December, 1887.

To the Honourable
THE COMMISIONER OF CROWN LANDS,

SIR,—I have the honour to submit herewith my first report in connection with fisheries under and within my inspectorate.

Since my appointment in August last, I have visited officially a large portion of the district under my charge, and find that the laws relating to the regulations of the fisheries are fairly well observed. No violations of the law have come directly under my notice but I have reason to believe that fishing with the aid of the Jack Light and spear, and even with dynamite, have been practised and may yet be practised to a very limited extent.

The varieties of fish abounding in the back lakes of the Peterboro' district are principally bass, maskinongé, salmon trout and brook trout.

Since my appointment last August I have received the sum of $20 for fishing permits, which amount I forwarded you.

In closing my necessarily brief report I can give you the assurance that so far as possible the laws and regulations relating to the fisheries of this district will be strictly and impartially enforced.

I have the honour to be, Sir,

Your obedient servant,

(Signed) F. J. MOORE,
Fishery Overseer.

APPENDIX No. 16.

STATEMENT of the number of letters received and mailed by the Department in 1885, 1886, 1887.

YEARS.	BRANCHES.					Transferred to other Departments.	Totals.	Names indexed.	Enclosures.	Orders in Council.	Returned—not called for at address.	Mailed from the Department.
	Sales and Free Grants.	Accountant's.	Surveyor's.	Woods and Forests.	Colonization Roads.							
1885	8,116	1,236	1,742	2,538	2,448	29	16,129	20,000	30,000	26	25	20,059
1886	7,590	1,088	1,877	2,855	2,487	30	15,927	20,000	30,000	13	40	20,368
1887	7,427	1,112	2,031	3,059	2,535	9	16,173	21,000	31,000	17	21	21,250

JOHN MORPHY,
Registrar.

AUBREY WHITE,
Assistant Commissioner.

TORONTO, December 31st, 1887.

APPENDIX No. 17.

STATEMENT of Municipal Surveys for which Instructions were issued during the year 1887.

No.	Name of Surveyor.	No.	Date of Instructions.	Description of Survey.	Date when Confirmed.
1	John McArce.....	543	12th April, 1887.....	To survey lots numbers 172, 173, 174, 175, 177, 178 and 179 in the 2nd range south-west of the Toronto and Sydenham Road, and lots numbers 171, 172, 173, 174, 179 and 180 in the 3rd range south-west of said road, and to plant durable monuments at the front and rear angles thereof—all in the Township of Artemesia.	
2	H. B. Proudfoot	544	2nd June, 1887.....	To survey lots numbers 28 and 29 in the 3rd and 4th Concessions of the Township of East Wawanosh, and to plant durable monuments at the front and rear angles thereof.	
3	A. J. B. Halford.....	545	29th August, 1887.....	To survey the line in centre of the road in rear of the lots east of the River aux Puce, and to plant durable monuments at the angles of the lots on the west side of the said road allowance in the Township of Maidstone.	

GEORGE B. KIRKPATRICK, P.L.S.
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, December 31st, 1887.

APPENDIX No. 18.

STATEMENT of Crown Land Surveys completed and closed during the year 1887.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount paid.	No. of Acres.
				$ cts.	
1	29th May, 1885	J. W. Fitzgerald	Township of Clara	51 45	55,311
2	29th May, 1886	G. B. Abrey	" Strange	15 84	24,512
3	29th May, 1886	Thos. O. Bolger	Examination of land at Rainy River	29 00	
4	23rd May, 1887	Alex. Niven	Outlines of townships at head of Lake Temiscaming (120 miles)	3,600 00	
5	31st May, 1887	Elihu Stewart	Township of Edgar	3,926 23	56,089
6	31st May, 1887	F. Purvis	" Hilliard	1,609 51	22,993
7	31st May, 1887	C. D. Bowman	" Bucke	1,596 63	22,809
8	31st May, 1887	B. J. Saunders	" Brethour	1,425 97	20,371
9	31st May, 1887	D. Beatty	" Harley	1,611 68	23,024
10	31st May, 1887	T. B. Speight	" Dymond	1,515 29	21,647
11	29th June, 1887	G. B. Kirkpatrick	Inspection at Keewatin, Sault Ste. Marie, etc	348 00	
12	27th May, 1887	P. Burnet	Examining and settling survey of Sunnidale (con. 1)	162 60	
13	16th July, 1887	W. O. Johnston	Surveying Reserve and Islands at Sault Ste. Marie	293 50	
14	7th October, 1887	H. R. McEvoy	" Timber Berths 41 and 49 North Lake Huron	612 00	
		F. L. Foster	For drawing maps	348 00	
		H. K. Wicksteed	For map of part of Rainy River District	30 00	
			The Copp, Clark Company, lithographed Township and District Maps	1,499 63	
			The Map and School Supply Company, mounting Maps	225 00	
			C. W. Irwin, duty and entry charges on Maps from C. M. Smith, N.Y	25 50	
			W. R. Kirkpatrick, copying plans, field notes, etc	182 00	
				$19,107 83	246,756

AUBREY WHITE,
Assistant Commissioner.

GEORGE B. KIRKPATRICK, P.L.S.,
Chief Clerk in Charge.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 19.

STATEMENT of Crown Land Surveys in progress and amounts advanced up to date during the year 1887.

No.	Date of Instructions.	Name of Surveyor.	Description of Survey.	Amount Advanced.
				$ cts.
1	29th May, 1886	J. W. Fitzgerald	Township of Fitzgerald	39 22
2	31st May, 1887	Thos. Byrne	" Anglin	3,450 00
3	31st May, 1887	J. W. Fitzgerald	" White	3,350 00
4	31st May, 1887	H. B. Proudfoot	" Harris and Casey	2,400 00
5	31st May, 1887	Jos. DeGurse	" Garson	1,475 00
6	31st May, 1887	Richd. Coad	" Hyman	1,500 00
7	31st May, 1887	F. Bolger	" Foster	1,475 00
8	31st May, 1887	J. S. Laird	" Lumsden	1,350 00
9	10th June, 1887	Jas. Dickson	Inspection of Surveys	2,926 20
10	14th December, 1887	H. DeQ. Sewell	Base line in Districts of Thunder Bay and Rainy River	1,200 00
11	14th December, 1887	A. L. Russell	Survey of lakes in Districts of Thunder Bay and Rainy River	1,200 00
				$20,365 42

AUBREY WHITE,
Assistant Commissioner.

GEORGE B. KIRKPATRICK, P.L.S.,
Chief Clerk in Charge.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 20.

STATEMENT of Mineral Lands which have been patented in Unsurveyed Territory in the District of Rainy River, during the year 1887.

No.	No. of Description.	PATENTEE.	Designation of Mining Tract.	Acres.	Amount.	Date of Patent.
					$ c.	
	R. R. 1	G. A. Graham and Donald McKellar.	Mining Locations, 10 E, 11 E, 12 E, Atic Okan River	210	420 00	27th May, 1887.
	" 2	A. W. Bradley	" R 72, R 73, Osinawe Lake	138¾	277 00	8th June, "
	" 3	W. W. Russell	" R 75, Osinawe Lake	66	132 00	2nd July, "
	" 4	Council of Township of Rat Portage	Block north of Hudson Bay Co.'s block, Rat Portage, for Park and Cemetery	37	34 00	15th " "
	" 5	A. C. Bruce	Mining Location, 50E, 51E, Carp Lake, Hunter's Island	236½	473 00	4th August, "
	" 6	John McKellar, *et al*	" R 71, Osinawe Lake	24	48 00	2nd September, "
	" 7	John McKellar, *et al*	Right to mine under road allowance in front of R 71, Osinawe Lake		16 00	7th October. "
	" 8	Robt. A. Mather	Mining Location, I 22, Keewatin, Lake of the Woods	18	36 00	13th " "
	" 9	Richard Fuller	" I 21, Keewatin	18	36 00	13th " "
	" 10	Thomas A. Gorham	" 211 P, Clear Water Bay, Lake of the Woods	50	100 00	19th " "
	" 11	A. C. Bruce	" 52E, 53E, 54E, 55E, 56E, 57E, 59E, 60E, on Cypress or Otter-Track Lake, Jasper Lake and Lilypad Lake, Hunter's Island	992	1984 00	7th November, "
	" 12	A. C. Bruce	" 58E, 61E, 62E, 63E, 64E, 65E, Emerald Lake, Hunter's Island	376	752 00	7th " "
	" 13	T. W. Dobbie, *et al*	" 218P, 219P, Pine Portage Bay, Lake of the Woods	351	702 00	2nd " "
	" 14	J. C. Hunter and D. A. Petre	" K 74, K 75, La Seine River	487	974 00	23rd December, "
	12252 AA	Hudson Bay Company	Block of Land at Rat Portage	690	Free.	14th " "
				3694¼	$5984 00	

GEORGE B. KIRKPATRICK, P. L. S.,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, December 31 , 1887.

APPENDIX No. 21.

STATEMENT of Mineral Lands which have been patented in Unsurveyed Territory in the Districts of Thunder Bay and Algoma, during the Year 1887.

No.	No. of Description.	PATENTEE.	Designation of Mining Tract.	Acres.	Amount.	Date of Patent.
					$ c.	
	2012	Oliver Daunais	North ½ of north ½ of lot 6 in 5th Con., township of Gillies	79	158 00	28th January, 1887.
	2013	William A. Allan	That part of lot 1 lying immediately north of R 161 in 2nd Con., Marks	80	160 00	" " "
	2014	Oliver Daunais	Mining Location, 54T, south of Paipoonge	153	306 00	" " "
	2016	D. McKellar and G. A. Graham	" 35E, east of Jack Fish Bay, Lake Superior	80	160 00	12th February, "
	2021	W. H. McDonald and H. A. Christy	McDonald Mining Location, on island near Portlock Harbour, Lake Huron	104	208 00	19th March, "
	2022	William A. Allan	Mining Location, R 238, Atic Lake, north of Arrow Lake	147	294 00	21st " "
	2033	P. A. Ferguson and J. L. Caverhill	" A, B and Island C, in Lake Tamagami	90	180 00	6th April, "
	2037	Arthur Harvey	" R 230, north-west of White Fish Lake	79	158 00	21st " "
	2046	A. F. Mills and J. F. Ruttan	" R 267, south-west of White Fish Lake	82	164 00	6th June, "
	2047	Jas. F. Ruttan	" R 264, south-west of White Fish Lake	80	160 00	" " "
	2055	Wm. A. Allan, *et al*	" R 289, south-west of Atic Lake	80	160 00	8th August, "
	2056	Wm. A. Allan	" R 268, R 269, Atic Lake	155	310 00	5th " "
	2057	Wm. Ward, *et al*	" 1P, 2P and Flat Point Islands A and B, Township McKinnon	319½	639 00	8th " "
	2062	S. W. Ray and W. A. Allan	" 19E, Atic Lake	79	158 00	18th " "
	2063	L. H. Coxetter	" R 100, Savanne River	75	75 00	11th " "
	2066	W. A. Allan	Water lot in front of R 238, Atic Lake	22	44 00	30th " "
	2066A	W. A. Allan	Release of Road allowance in front of R 238, Atic Lake	.....	6 00	24th " "
	2082	Jas. Rood, Jr	Mining Location, 291T, 292T, 293T, 295T, Gun Flint Lake	722	1444 00	1st October, "
	2085	Christina Healey	" 31E, Sand River, West of White Fish Lake	80	160 00	10th " "
	2086	Gustave d'Odet d'Orsonens, *et al*	" A, B, D, E, H, I, West of Desbarat's Location, Lake Huron	1600	.....	11th October, 1887, in lieu of 973, 29 July, '75.
	2100	Jas. Rood, Jr	" 294T, 296T, 297T, 298T, 299T, Gun Flint Lake	551	1102 00	2nd November 1887.
	2099	William Sedgewick	" 1X, 2X, 3X, 4X, 5X, 6X, 7X, North Lake, near Gun Flint Lake	1424	2848 00	3rd " "
	2091	F. D. Moore	" E, near Straight Lake	160	320 00	24th October, "
	2092	E. D. Moore	" F, near Straight Lake	80	160 00	" " "
	2098	W. C. Caldwell	" R 311, R 313, R 315, R 317, R 319, Gun Flint Lake	874	1748 00	29th " "
			Carried forward	7195½	11122 00	

APPENDIX No. 21.—*Continued.*

STATEMENT of Mineral Lands which have been patented, etc.

No.	No. of Description.	PATENTEE.	Description of Mining Tracts.	Acres.	Amount.	Date of Patent.
					$ c.	
			Brought forward	7195½	11122 00	
	2125	T. Marks, *et al*	Mining Location, R 282, R 281, north of Macgregor	295	590 00	15th December, 1887.
	2126	C. E. Shannon, *et al*	" R 310, south side of Sand Lake	97	194 00	" " "
	2128	C. M. Parkhurst, *et al*	" R 329, north of Arrow Lake	80	160 00	14th " "
	2129	W. H. Laird	" R 78, north-west of White Fish Lake	160	160 00	9th " "
			Total	7827½	12226 00	

GEORGE B. KIRKPATRICK, P. L. S.,
Chief Clerk in Charge.

AUBREY WHITE,
Assistant Commissioner.

DEPARTMENT OF CROWN LANDS,
TORONTO, 31st December, 1887.

APPENDIX No. 22.

Number of Patents issued by the Patents Branch during the year of 1887.

Public Lands (late Clergy Reserve)	52
Crown	310
Free Grants	221
Free Grants under Act of 1880	258
Mining	148
School	109
Licenses of Occupation	3
Total	1,101

AUBREY WHITE,
Assistant Commissioner.

ARTHUR J. TAYLOR,
Chief Clerk in Charge.

Department of Crown Lands,
Toronto, 31st December, 1887

APPENDIX No. 23.

STATEMENT OF THE NAMES OF CANDIDATES WHO HAVE PASSED THEIR EXAMINATIONS BEFORE THE BOARD OF EXAMINERS OF LAND SURVEYORS FOR ONTARIO, DURING THE YEAR 1887.

PRELIMINARY CANDIDATES PASSED.

Louis Rorke,
Thomas Herbert Taylor.
Abel S. Weekes.
Albert Dyke Griffin.
Robert Kirkpatrick.

FINAL CANDIDATES PASSED AND SWORN AS PROVINCIAL LAND SURVEYORS.

Herbert Joseph Bowman, Graduate School of Practical Science.
Joseph Philippe Baby Casgrain, D.L.S.
Henry Lionel Esten.
Owen McKay, Graduate School of Practical Science.
John Richard Odlum Vicars, D.L.S.
Hugh Burnet, D.L.S.
Eder Eli Henderson, Graduate School Practical Science.
Frederick Henry.
James Henry Kennedy, Graduate School Practical Science.
William Lyon Mackenzie.
Vaughan Maurice Roberts, D.L.S.
Frederick John Ure.
Arthur Meyer Bowman, Graduate School Practical Science.
Robert Laird, Graduate School Practical Science.
Edward Joseph Rainboth, D.L.S.
John Stewart, D.L.S.

The Board of Examiners of Land Surveyors, for Ontario, meets at the office of the Commissioner of Crown Lands, on the first Monday in each of the months of April and November, in every year, unless such Monday be a holiday (in which case they shall meet on the day next thereafter, not being a holiday). Section 6, Chapter 152, Revised Statutes of Ontario of 1887.

PRELIMINARY EXAMINATION.

All persons, with the exception of Graduates of the Royal Military College at Kingston, and of the Ontario School of Practical Science, before they can be apprenticed to a Provincial Land Surveyor, must pass a satisfactory examination before the Board of Examiners in the following subjects: Penmanship, Orthography, Fractions, Decimals, Square Root, Logarithms, Algebra (including Equations to the first degree), Euclid (first four books), Plane Trigonometry, the Rules for Spherical Trigonometry, Mensuration of Superficies, the use of Ruling Pen and construction of Plain and Comparative Scales.

FINAL EXAMINATION.

Final Candidates, before obtaining a License to practise, undergo a strict and searching examination before the Board of Examiners in the following subjects, viz.: Geometry, including the first six books of Euclid (with the exception of the last thirteen propositions of the Fifth Book); Algebra, including Progressions, Plane and Spherical Trigonometry;

Mensuration of Superficies; Laying out and dividing up of Land; Descriptions by Metes and bounds for Deeds and other documents; the Use and Adjustment of Surveying and Levelling Instruments; the laying out of Curves; Practical Astronomy, including finding of time, latitude, longitude, Azimuth, Variation of the Compass, and drawing Meridian lines; the Acts relating to the Survey of Lands in Ontario, the general Mining Act, the Registry Act (so far as it refers to Plans), the Municipal Acts, (so far as they relate to Roads Surveys and Drainage), the Ditches and Water Courses Act; the Theory and Practice of Levelling; the Principles of Evidence; Drawing of Affidavits; Taking of Field Notes and Preparing Plans; the Rudiments of Geology and Mineralogy, and the Sufficiency of their Surveying Instruments.

AUBREY WHITE,
Assistant Commissioner.

GEORGE B. KIRKPATRICK, P.L.S.
Chief Clerk in Charge.

Department of Crown Lands,
Toronto, December 31st, 1887.

SURVEYORS' REPORTS.

(*Appendix No. 24.*)

TOWNSHIP OF LUMSDEN.

District of Algoma.

Essex Centre, Ontario,
December 12, 1887.

Sir,—In compliance with your instructions bearing date May 31st, 1887, I have made a survey of the Township of Lumsden, in the District of Algoma, and I have the honour to report thereon.

I travelled by rail to Chelmsford Station, on the Canaadin Pacific Railway, thence by bush road through the township of Rayside, to the township of Lumsden. I found the north boundary of Rayside, and a post marking the north-west angle of lot four. Taking an observation of Polaris at this point I retraced the north boundary east across lots numbers four and three, further east I could find no trace of the line. From the post at the north-west angle of lot number two I produced the line due east eighty chains and twenty links; the width given for lots one and two in the township of Rayside. Being unable to find the post marking the north-east corner of the township of Rayside I planted a post in the proper place for the south-east angle of the township of Lumsden. Thence I proceeded with the survey running such lines and planting such posts as directed in my instructions.

The surface of the township is very irregular, swamps and extensive elevations of bare rock alternating.

There is but very little arable land south of the fourth concession. The country has been run over by fire. There are no settlers in the township. The timber is of very little importance, and in a small section of the eastern part of the township I found a few scattered pine of fair quality.

I could find no indications of minerals of any importance. The prevailing class of rock is gneiss.

The Vermillion river crosses the township through the third and fourth concessions. A few small lakes are found at the north and west of the township, but the percentage of water surface is very small.

Accompanying are plans and field notes prepared in accordance with instructions.

Respectfully submitting the above.

I have the honour to be, Sir,
Your obedient servant,

(Signed) JAMES S. LAIRD.
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 25.*)

DISTRICT OF ALGOMA.

Township of Foster.

Penetanguishene, Ontario,
November 9th, 1887.

Sir,—I have the honour to submit my report of the survey of the township of Foster, in the district of Algoma, surveyed according to your instructions, bearing date 31st day of May last.

I was obliged to deviate to some extent from your instructions regarding the point of commencement of my survey. Instead of commencing at the south-east angle as directed, I started my survey at the south-west angle.

I trust the following explanation will be deemed satisfactory for my departure from my written instructions.

After a diligent search for the point on Long Lake—an expansion of White Fish River, where Salter's second meridian line crosses. I failed to discover a trace trace of the line, the country on both sides of the lake being burnt over. I retraced my steps, and returned with my party, examining the shores closely, as we passed along near the west end of the lake, I discovered a well blazed line, running due north ; I found this to be the easterly line of an Indian reserve. I followed this up as far as it ran and about two miles farther north I found the post marking the south-west angle of the township. Taking an astronomical observation here, I ran a trial line due east to hit the post planted at the south-east angle of the township by Salter—a distance of five miles, seventy-one chains and seventy-eight links brought me opposite this post ; and at a distance of five chains and ninety-five links due north from it ; correcting according to this offset, and the distance chained, the bearing of the south boundary is south eighty-nine degrees and seventeen minutes east astronomically.

The lot posts were duly planted on the corrected line, the chaining being from the west to the east.

I retraced and reblazed that part of Salter's second meridian line south of Lac Penage, the portion north of the lake I found had been previously re-run, this portion was chiefly brule.

As will be seen by inspection of the timber map, the township throughout its entire extent is well timbered, white and red pine being very abundant, generally of a medium size and fair quality. The other kinds of timber are maple, birch, elm, ironwood, hemlock, tamarac, and cedar, all of excellent quality.

The surface of the township is broken by high and prominent ridges. There is a rough and broken country on concession five and six, adjoining the Vermillion River. There is a small patch of burnt country in the north-east and north-west corners of the township.

With the exception of the sixth concession, the soil of which consists of a stiff white clay, the township is well adapted for farming. The soil is excellent, consisting of sandy and clay loam. An abundance of excellent timber. It is well watered by numerous creeks and lakes. It is easy of access by means of the Canadian Pacific Railway, which passes within two miles of the north-west corner.

Two rivers of considerable extent, the Vermillion and Spanish are found within its limits. The former is a navigable stream, averaging a width of four chains, with a depth of from seven to eight feet. There are falls and rapids on lots numbers five and six, concession six, and lots number ten and eleven, in concession five. It runs a distance of three and a half miles in the northerly part of the township, its course being slightly south of west and discharges into the Spanish river on the east boundary, at concession five, lot number twelve.

The Spanish River crosses the north boundary about ten chains from the north-west angle, and running in a south-westerly direction, crosses the east boundary at the line between the fifth and sixth concession.

The water in the lakes is deep and clear, containing an abundance of fish, principally black bass.

In many places in the township copper and iron pyrites were found. There were also some slight traces of galena met with. A few specimens of an hematite were found, but no magnetic iron ore.

The variation of the compass was uniform throughout, being 3° 51′ west.

There being no squatters or improvements of any kind, no inspection returns will be required. As regards natural history, I may remark that beaver are found in considerable numbers, moose are found also, and bears of course; and mink are numerous on Vermillion River.

The plan, field notes, with timber map of the township, accompany this report.

I have the honour to be, Sir,
Your obedient servant,

(Signed) FRANCIS BOLGER,
Provincial Land Surveyor.

The Honorable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 26.*)

DISTRICT OF ALGOMA.

Township of Hyman.

Glencoe, Ontario,
November 15th, 1887.

Sir,—In pursuance of your instructions, dated the 31st day of May, 1887, to survey the township of Hyman, in the district of Algoma, into lots of 320 acres each I have the honour to submit the following report:—

Leaving Glencoe on the 27th day of July, I went by rail to Toronto and Owen Sound, thence by boat to Algoma mills, and again by the Canadian Pacific Railway to camp number forty, about two and a half miles from the south-east corner of the township. There we packed into the township along Spanish River, and took an observation for latitude and a azimuth on the east boundary at the north side of the Spanish River, on the night of the second of August, and commenced the actual survey of the township on the following day, running as a base line, connected with this observation, the line between the first and second concessions. I took two other observations during the progress of the work to secure accuracy, one on lot number seven, concession one, on north side of the Spanish River, on the night of the 13th of August, the second, on line between lots numbers six and seven, in the fourth concession, on the night of the 25th of August. The places of observation are shown on the index map of field notes.

The instruments used were Stanley's six-inch transit theodolite reading to twenty seconds, a five-inch compass of Gurley's make, and steel band chain.

The southern part of the township is traversed by the Spanish River, a stream varying in width from one to six chains, and having many rapids and falls, the largest of which are on lot one, in the first concession, and which will furnish good water power for mills. Falls of considerable height, (some fifteen feet), are also found near the north-east angle of lot nine, in the first concession. The river enters the township on the south boundary, near the line between lots numbers eleven and twelve; it then has its course in a north-easterly and easterly direction, through lots numbers twelve, eleven, ten, nine and eight, and part of seven, in the first concession, and lots seven, six, five, four and part of

three, in the second concession. From this point the course is south-easterly, through lots three, two, and part of one, in the second concession, and part of lot one, in the first concession, leaving the township on the east boundary.

The township north of the river is watered by two large creeks, from fifty links to one chain in width. The westerly one would be of sufficient size to float logs at almost all seasons of the year; it enters the township on the north boundary, on lot number twelve, and runs in a southerly and easterly and south-westerly direction, entering the Spanish River on lot number ten, in the first concession. The easterly creek, somewhat smaller, enters on the north boundary on lot number five, it thence runs in a south-easterly direction, leaving the township on the east boundary near the centre of the third concession.

The country to the south of the Spanish River is hilly and rocky. The timber has been burnt from this part of the township, apparently some six or eight years since, with the exception of a few small patches, where some fairly good pine is found. The part burned is now grown over with second growth of poplar, birch and pine.

On the north side, and in close proximity to the river the country is somewhat broken by rocky ridges, but towards the northern part of the township it becomes more rolling and level. This district north of the river is all green bush, the timber being pretty generally mixed and tolerably uniform throughout, with the exception o sma areas where cedar, tamarac and spruce predominate.

The timber is chiefly pine, spruce, balsam, cedar and birch. There is considerable good pine of marketable quality in the township.

Near where the westerly creek above mentioned crosses the line between the first and second concessions, on lot number ten is a splendid mill site. The falls being thirty feet or more in height.

The soil is chiefly sandy with many rocky exposures. Towards the north-west part of the township the soil becomes more of a sandy loam and in places clayey.

The township will be chiefly adapted for grazing, and is well watered with numerous streams.

On some of the rocks along the line between lots numbers six and seven, across the fourth and fifth concession, and some of the rocks on the line between the fourth and fifth concession, to the east of the line between lots number six and seven, there is some little show of mineral.

The township is easy of access from the Canadian Pacific Railway line, and for the most part, along the river and creeks, roads could be made at no very great expense.

All of which is respectfully submitted.

I have the honour to be, Sir,
Your obedient servant,

(Signed.) RICHARD COAD,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 27.*)

DISTRICT OF NIPISSING.

Outline of Townships at the Head of Lake Temiscaming.

Haliburton, Ontario,
November 23rd, 1887

Sir,—I have the honour to submit the following report on the survey of outlines of townships, north coast of Lake Temiscaming, in the District of Nipissing, surveyed under your instructions of ne 23rd day of May, 1887.

Leaving Haliburton on the 9th of June and getting to my destination on the 14th, I commenced the survey on the morning of the 15th of June, and completed same on the 10th of October, returning to Haliburton on the 17th of that month.

I commenced my survey at north-west angle of township number one on my last year's work, now called the township of Bucke, and carried on the survey in accordance with instructions. The lines being run east and west and north and south astronomically, and posts planted every mile on the north and south lines, and every half mile on the east and west lines. The townships are numbered as per plan, and the lines were run in the following order :—

South boundary of township nine.
West boundary of township nine.
Boundary betweeen township nine and ten.
West boundary of township ten.
Boundary between townships ten and eleven
West boundary of township eleven.
Boundary between townships eleven and thirteen.
Boundary between townships thirteen and fourteen.
Boundary between townships thirteen and fifteen.
North boundary of township fourteen.
East boundary of township fourteen.
East boundary of township fifteen.
North boundary of township fifteen.
North boundary of township sixteen.
Boundary between townships twelve and thirteen.
Boundary between townships fifteen and sixteen.
Boundary between townships twelve and sixteen.
South boundary of township twelve.
West boundary of township twelve.
West boundary of township sixteen.

The details of survey will be found in the field notes and on the plan.

Numerous observations were taken as the work progressed, although only a few are shown in the notes. The magnetic declination varied from six to ten degrees west. The lines were run with a transit, well cut out and well blazed, and all posts protected by stones when they could be had.

The courses given to bearing trees are magnetic. I am glad to be able to report nearly the whole of the townships outlined as good agricultural land, the soil being generally clay, and for the most part free from stone. The land is more rolling and higher than the tract of land south and east, outlined last year. There are some sandy ridges and sandy flats also, and there are numerous high hills, composed altogether of rock, but generally speaking the rock is all in one place and the soil in another. Of the eight townships outlined, four-fifths of the whole area are good farming land, and they are all fit for subdivision.

The timber where not burnt is generally spruce, tamarac, balsam, poplar, balm of gilead, white birch, and pitch pine. There is also cedar in many places and some good white pine, scattered through townships nine and ten and along the south boundary of township twelve. There is also some good pine in the north-east corner of township fourteen and extending to the north and east. The only black birch met with during the survey is on a tract a few miles in length on the boundary between townships twelve and thirteen, this tract of land is high and dry and the timber is the oldest met with north of Lake Temiscaming. Townships nine, ten, eleven and part of thirteen are well wooded, the principal timber being spruce, of fair size and good quality, and which will doubtless be valuable as timber limits at no distant day. The finest white spruce I have seen in Ontario is to be found on the west boundary of township twelve, on both sides of the Blanche River.

The greater part of townships twelve, thirteen, fourteen, fifteen and sixteen is "brule" or burnt country, (tinted pink on plan), now grown up with poplar, white birch, cherry, pitch pine, etc., the date of the fire being about sixteen years ago. In most places the brush is very thick and difficult to get through, but in many places the brule is open and grassy.

The tract of country outlined is comparatively level, but there are many rocky hills of considerable elevation—notably one on the south boundary of township twelve, on lots four and five, which is about five hundred feet over the general elevation of the country, and from which the country can be seen in every direction for a distance of from twenty to forty miles. Along the north boundary of township fourteen there are some high hills and the country to the north of this is mountainous and rocky and unfit for settlement.

The geological formations are Huronian and the Trenton limestone, excepting in township sixteen, where the Laurentian occupies a strip about two miles in width.

I found no traces of minerals; but quartz veins are very numerous, and copper has been found to the north of township fifteen.

The country may be said to be well watered by streams; the Blanche River, with its branches and tributary creeks draining almost the whole area.

There are numerous falls and rapids affording excellent mill privileges on the Blanche and its branches. The first from Lake Temiscaming, (about four feet), occurring in township thirteen, about a mile below the east branch; after passing the fourth concession of township fifteen they are of frequent occurrence, and vary in height from ten to sixty feet; the highest being on the south branch, near the boundary between townships twelve and thirteen.

Wahbees' creek extends through township ten, and has it source near the Montreal River.

There are no lakes except those shown on the south-west corner of township nine and to the north of township fourteen.

The weather was exceedingly warm in July, and during this month rain fell almost every day. August and September were fine, and October to the close of the work was wet. The only time during the whole season that fire would run was towards the end of September.

Our first frost was on the morning of the 26th of August, and the next on the 24th of September, after which the nights were cold.

There being no settlers within the territory outlined, I cannot speak of the crops, and can add nothing to my remarks in last year's report.

The facilities for settlement also remain unchanged. In conclusion I may say, that there are at least two townships of excellent level land west of townships ten and eleven, which I could see from the hills at the north-west angle of township nine and south boundary of township twelve. And I am of the opinion, that there would still be, west of these two, another tier of townships which could be extended north to the west of townships twelve and sixteen, and east to the north of townships fifteen and sixteen.

It is probable that there are one thousand square miles in this tract of good land north of Lake Temiscaming, between the Provincial boundary and the Montreal River.

Herewith I send plan and field notes of survey.

I have the honuor to be, Sir,
Your obedient servant,

A. NIVEN,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 28.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF EDGAR.

COLLINGWOOD, ONTARIO,
December 28th, 1887.

SIR,—I have the honour to submit the following report on the survey of the township of Edgar, in the district of Nipissing, in accordance with your instructions, bearing date the 31st day of May, 1887.

I commenced the survey at the north-east angle of the township, and worked southerly and westerly from this point.

The Petewawa River flows across the township from west to east. The country north of this stream is rocky and mountainous, with very little covering of soil, and the timber has nearly all been destroyed by fire, the only exception being a limited portion towards the west boundary.

The country south of the river is much less rugged and broken, and a fair percentage of it might be utilized for grazing purposes and even for the growth of cereals if kept well manured, as evidenced by the very good oats and root crop, to be seen growing on Stuart & Grier's depot farm, near the south-eastern part of the township. Here, too, the numerous fires that have swept over the country have left but little green timber. The usual growth of small poplar and birch is everywhere met with on the brule. I endeavored to retrace the timber limit lines, but, owing to the fires, I was unable to do so with any degree of accuracy.

No minerals of any value were found during the progress of the work.

A waggon road leads from McKay Station, on the Canadian Pacific Railway to Stuart and Grier's farm, the Petewawa being crossed on a floating bridge. This could be made a very fair road with a moderate outlay of money, and well deserves the attention of those engaged in that branch of the service.

Very few lakes are to be found in the township. Lake Rouge, near the north-west, and Lake Traverse, on the west boundary, being the largest.

I have the honour to be, Sir,
Your obedient servant,

(Signed) E. STEWART,
Provincial Land Surveyor.

The Honourable T. B. PARDEE,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 29.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF ANGLIN.

SARNIA, ONTARIO,
October 17th, 1887.

SIR,—I have the honour to report that in accordance with your instructions, dated the 31st day of May last, I have completed the survey of the township of Anglin.

I commenced the survey by taking an observation of Polaris at the post on the west boundary between the fourth and fifth concessions, which I ran N.69° 08'.20"E., making it the base of the survey, laying off the various side roads and concession lines, in accordance with the instructions and projected plan.

The whole township with the exception of a few small patches has been overrun by fire at different times, destroying all the valuable timber. It is now covered with a dense growth of poplar, cherry, etc.

The general character of the township is hilly, some of the hills are of considerable height.

That portion lying to the south of Crow River, and south and west of Lake Lavielle, is a light, sandy soil, tolerably free from rocks and stones. The timber being mostly poplar.

The portion south of Lake Lavielle is rocky and stony, hardwood land with some good pine.

The balance of the township is light sandy soil, generally stony, and mostly burnt country. I have shown as nearly as possible, on the timber tracing, the tracts of green timber.

In the north-eastern part of the township, I found a number of old clearings, which have been abandoned by the lumbermen and are now grown up with cherry, birch and poplar.

On the whole there is very little timber of any value left in this township.

It is well watered by numerous streams and lakes. The principal streams being the Little Madawaska, in the northern part, and Crow River in the southern part of the township.

The only lake of any importance is Lake Lavielle, which extends from lot number fourteen to lot number thirty-seven, in the third concession, a distance of about six miles, and from the sixth concession it extends south into the township of Dickson.

I saw no valuable minerals. The geological formation is Laurentian.

I have the honour to be, Sir,
Your obedient servant,

(Signed) THOMAS BYRNE,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 30.*)

DISTRICT OF NIPISSING.

Township of White.

Peterboro, Ontario,
November 29th, 1887.

Sir,—I have the honour to submit herewith the field notes and plan of survey of the township of White, performed under your instructions of the 31st May, 1887.

The township is situated in the valley of the Petewawa River, which flows through it in a southerly and easterly direction.

The river flows over a rocky bed, rapids following one another in close succession from where it enters the township to Lake Traverse, which is crossed by the east boundary.

There are various improvements on the river such as slides, dams, chutes, etc.

The banks are generally low and rocky, in a few instances marshes extend out several chains from the river on either side. These are generally flooded by back water from the dams, but this season were, owing to the continued drought, quite dry when I saw them in July and August.

The White Partridge River takes its rise south of the township, crossing the south boundary on lot number thirteen and enters the Petewawa on lot number twelve, on concession ten. It is joined by Lavielle creek, on lot number eleven, cocession five, which rises inthe township of Anglin.

Both streams are used for the passage of sawlogs and timber, the latter mostly composed of red pine, and of small average.

The only other stream of any importance in the township is the Little Madawaska, which crosses the east boundary in concession two and enters Lake Traverse on lot number thirty-four, concession six. It also is used for the passage of logs, etc.

All the country lying south of concession lines twelve and thirteen, and east of side-lines twenty-five and twenty-six, is almost destitute of timber, being a white sandy plain, covered with jack pines, small poplars, whitewoods, etc. The northerly and north-westerly part of the township is generally rough and broken, and in places covered with a thick growth of small poplar, birch, alder, willow, etc.

The corresponding southerly and south-westerly part is for the greater part flat, a flat county except along Lavielle creek, where it is rocky and broken.

There is a fairly good patch of land commencing at the junction of White Partridge River and the creek aforesaid along the west side of the former, to the south boundary. It extends back from the river about one-half mile, and is covered with green mixed bush, of which pine, birch and balsam form the major part.

There is little hard wood except a small patch on concession fourteen, from lot number thirty-one to the east boundary and in a few other isolated spots, as shown in field notes.

But a comparatively small proportion of the township escaped the destructive fire which swept over the district some twenty years ago, as the blackened and charred pines that still remain towering above the dense tracts of poplar and willow brush amply attest.

The swamps are generally level and comparatively dry. The bush in them is mostly composed of tamarac and spruce, averaging up to twelve inches in diameter, and is in places of fair quality. There are a few swamps yielding stunted cedar of no value.

The soil in these swamps is generally of alluvial mould, on clay and sand bottom, and by drainage might be rendered suitable for excellent pasturage.

On the uplands and slopes the soil is of a sandy character, mixed occasionally with red and brown clay, sand and gravel in places, the whole resting on stiff clay, sand, gravel and on rock beds.

Large granite boulders are thinly scattered over the township, and stony tracts are also met with.

The lakes, which are not numerous or large, are of clear deep water, and it is said are not over abundantly stocked with fish of any kind.

Little if any game was seen during the survey. Several springs of cool clear water are in the township, which notwithstanding the unprecedentedly hot and dry summer, never failed in running water. Owing to the ravages of the destructive fire referred to no reliable traces of any former survey were discovered.

Frequent disturbances of the magnetic needle have been observed, especially in the easterly part of the township.

The general magnetic variation is 8°.06'. 40" west. Of the total area of the township about thirty per cent. may be rendered fit for the growth of the usual kinds of root crops, and a good proportion of the remainder made useful for pasturage, etc.

I have the honour to be, Sir,
Your obedient servant,

(Signed) J. W. FITZGERALD,
Provincial Land Surveyor.

The Honourable T. B. PARDEE,
Commissioner of Crown Lands,
Toronto.

(Appendix No. 31.)

DISTRICT OF NIPISSING.

Township of Garson.

Windsor, Ontario,
November 1st, 1887.

Sir,—I have the honour to report that in compliance with your instructions, dated May 31st, A.D. 1887, I have completed the survey of the township of Garson, in the district of Nipissing.

I proceeded from Toronto by way of the Northern and North-western Railway to North Bay, on Lake Nipissing, thence by the Canadian Pacific Railway to Romford, in the township of Neelon.

Here I retraced the line between lots four and five to the north boundary, in order to pack in supplies, etc., for the survey.

I then retaced said boundary and made it the south boundary of the township of Garson. I ran my concession lines due east astronomically, commencing at the posts already planted on my east boundary. I also commenced my side lines eighty chains distant one from the other, and intersected the posts planted on my north bonndary by Provincial Land Surveyor, McEvoy.

About fifty per cent. of this township may be considered fit for agricultural or grazing purposes, the soil being sandy loam with occasional patches of clay loam. The remaining portion is gneiss or granite rock, with the former prevailing.

This township is remarkably free from small lakes, only one being found in the whole survey. Numerous small creeks were met with, but on account of their low lying banks, could not, in my opinion, be utilized for "driving purposes."

There is a small area of brule at the south-east and south-west corners of the township, covered with dead pine, small birch, poplar, etc. The rest of the township is covered with spruce, balsam, maple, birch, cedar, tamarac, red and white pine. The two latter are found in abundance throughout nearly the whole of the township. In the first five concessions they are exceedingly large and of excellent quality. Although there is a natural drawback in the way of shipping this timber on account of the smallness of the creeks, yet the country is so level between here and the Canadian Pacific Railway that good roads could be built with little cost.

No economic minerals were met with, and very little disturbance to the magnetic needle.

Accompanying you will find field notes, plans, etc., all of which I trust will prove satisfactory.

I have the honour to be, Sir,
Your obedient servant,

(Signed) JOSEPH DE GURSE,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands
Toronto.

(*Appendix No. 32.*)

TOWNSHIP OF DYMOND.

District of Nipissing.

Toronto, Ontario.
November 30th 1887.

Sir,—I have the honour to submit the following report on the township of Dymond, District of Nipissing, surveyed by me this season, in accordance with the instructions received from your department, bearing date the 31st day of May, 1887 :—

I commenced my first concession line at the post planted by Provincial Land Surveyor Niven for the north-west angle of lot one, concession one, and from this point ran due east astronomically, planting posts at the intervals required by the instructions. All concession lines were run due east and west, and all side lines due north and south. As shown by the projected plan accompanying the instructions.

In general terms, I may say, that this township is admirably adapted to agricultural purposes, the soil being chiefly good clay, and in places sandy loam, with clay sub-soil. Fully ninety per cent. of the land in the whole township is of excellent quality. All that part lying to the north-east of Wahbe's Creek, with the exception of the stony ridge, shown on the accompanying plan, may be considered superior farming land—it being fairly level. The portion of the township lying south-west of Wahbe's Creek is somewhat rolling, with a wet tamarac and spruce swamp in the north-west portion thereof, and a few small stony tracts in the vicinity of the south boundary.

With these two exceptions all this part may also be considered excellent for farming purposes.

Wahbe's Creek, which enters the township near the north-west angle, and crossing it in a south-easterly direction, enters into Lake Temiscaming, has banks varying from ten to twenty feet in height, thus affording a fine channel for carrying off the water from the numerous smaller streams which drain the township.

Chief among its tributaries is a stream of about equal volume, though not more than one-third its width, entering Wahbe's Creek about three miles from the lake. This stream has a good water power on lot number four, concession three.

The timber throughout this township is small, and consists principally of spruce, tamarac, poplar, whitewood, cedar, and balsam, with some black birch, white oak, black ash, elm, and soft maple. The northerly portion was burnt over many years ago, and has now very little merchantable timber. A dense growth of underbrush covers nearly the whole township.

I found no economic minerals or indications of them.

There are at present no settlers residing in this township, but a short distance from the mouth of Wahbe's Creek is a "fallow" of about two acres chopped—but not cleared or burnt.

Judging from the character of the timber, the labour necessary in clearing would be comparatively light, and from the physical features of the country, the expense of opening up roads for settlement will be small, so that we may reasonably hope to see this township at no distant day the home of prosperous farmers, who will find a ready market for their produce among the lumber merchants of the Ottawa.

Accompanying this report are plans, field-notes of the survey.

I have the honour to be, Sir,
Your obedient servant,

THOMAS B. SPEIGHT,
Provincial Land Surveyor.

The Honourable T. P. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 33.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF HARLEY.

PARRY SOUND, ONTARIO,
November 4th, 1887.

SIR,—I have the honour to report that I have completed the sub-division survey of the township of Harley, according to instructions received from your office, and dated May 31st, 1887. I commenced said survey at the post between lots numbers two and three, on the south boundary, when I observed Polaris at its eastern elongation on the night of July 25th, and ran line north through concessions one and two, and ran line east and west between concessions two and three, making it and the south boundary base lines for work in the southern part of the township, and for the northern part I made line between concessions four and five my base line.

The greater part of the south-west quarter of the township is spruce and tamarac swamp, and the south-east quarter is timbered principally with spruce and tamarac and is low land, but not wet, excepting in places where there is cedar. With the exception of a spruce, cedar, and tamarac swamp in the north-east corner, the northern half of the township is higher land than the south—with considerable poplar (the greatest part of which is dead) scattered throughout. There is also some scattered pine timber, but not enough for the requirements of a settled township.

The soil is principally clay, but in places there are beds of round stones a few inches under the surface.

With the exception of a portion of the north-east quarter the township is drained by Wahbe's Creek, said north-east portion being drained by Blanche River.

About seventy per cent of the township is fit for settlement.

I have the honour to be, sir,
Your obedient servant,

(Signed) DAVID BEATTY,
Provincial Land Surveyor.

The Honourable T. B. PARDEE,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 34.*)

DISTRICT OF NIPISSING.

TOWNSHIP OF BRETHOUR.

FARMERSVILLE, ONTARIO,
October 29th, 1887.

SIR,—I have the honour to submit the following report of the survey of the township of Brethour, in the district of Nipissing, in accordance with instructions dated May 31st, 1887.

I commenced the survey of this township by running the line in front of the second concession due east from Provincial Land Surveyor Niven's post on the west boundary, and planted the lot posts at every half mile for ten lots—the eleventh being a fractional

one of about twenty-five chains width, and adjoining the boundary line between the Provinces of Ontario and Quebec.

The magnetic declination varied from $8\frac{1}{4}°$ west to 15° west generally, but in some parts, as concession six, it was much greater, and subject to fluctuations.

The Blanche River flows through the south-west corner of the township, which point is about twelve miles from the head of Lake Temiscaming.

There are two creeks, Otter Creek and Wrights Creek, of from sixty to eighty links width, falling into the Blanche River. Otter Creek enters the township on the north boundary, flows in a south-westerly course, and leaves it at a distance of about one and a half miles from the north-west corner, to enter again at nearly the same distance from the south-west corner, flowing in a south-easterly course, and finally leaving the township one mile from the south-west corner. It empties into the Blanche one mile farther down. This creek is free from logs, but shoaly, and is generally of a slow current. The bottom consists of clay and gravel. Wrights Creek enters from the Province of Quebec, at about one and three-quarter miles from the north-east corner and soon leaves again; re-enters near the centre of the east boundary, flows south-westerly, and leaves the township with a southerly course, two-miles from south-east corner. This creek has been utilized in the past for "driving" and is now filled up with logs. It is free from shoals, and has a depth from two feet to five feet. Both of the creeks are navigable for small boats or canoes during the summer season until the first of July. Their water is muddy and similar to that of the Blanche River. Their banks have a height of from twenty to thirty feet in the southerly portions, but become more rugged and rise to a height of from fifty to seventy-five feet as you proceed up stream. Throughout almost the entire township there are numerous small creeks—the water of which was always found pure. There are no lakes.

The surface of the country is flat to undulating, with a few hills at the northern and eastern portions.

The timber consists chiefly of spruce, balsam, and tamarac, with scattered birch, cedar, and poplar along creeks. There are very few pine, as will be seen by reference to the timber plan. An occasional black ash and water elm were seen. All the above-mentioned timbers reach a size of twenty-five inches.

In the north-west corner there is a brule fifteen or twenty years old. This portion is now densely covered with tamarac, spruce, balsam, poplar, birch and willow, of from one to three inches diameter.

No economic minerals were met with. The soil consists of clay over the entire area of the township, with a thick covering of decayed vegetable matter, and loam in places. Rock was noticed in six or seven places—only in the form of hills rising to a height of from fifty to seventy-five or one hundred feet.

The only real swamp of any extent lies in the first, second, and third concessions, and even this will be rendered valuable by drainage upon the opening of the county by settlers.

The township is essentially an agricultural one.

I have the honour to be, sir,

Your obedient servant,

(Signed) B. J. SAUNDERS,

Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(Appendix No. 35.)

DISTRICT OF NIPISSING.

Township of Bucke.

West Montrose, Ontario,
October 20th, 1887.

Sir,—I have the honour to report, that in accordance with your instructions, dated May 31, 1887, I have completed the survey of the township of Bucke, in the district of Nipissing.

I am glad to report that the greater part of this township is adapted for agricultural purposes—being a good clay soil, comparatively free of stone and rock. Roads could easily be made to nearly any lot in the township, and, as it is well watered with beautiful spring creeks, will make a very desirable location for settlement.

There are no large streams in the township, the main creeks being a branch of Wahbe's Creek, called the "little Wahbe's Creek," and Mill Creek. The little Wahbe is about thirty links wide, enters the township on lot number one, in the third concession, and leaves it on lot four, in the sixth concession.

Mill Creek enters the township on lot number eleven, in the first concession, and enters into Lake Temiscaming from lot number fourteen in the second concession.

There are only two small lakes in the township, which are traversed and connected with the lines of survey.

The timbes generally along Lake Temiscaming, on concessions two, three, and four is cedar of excellent quality, the balance of the township is timbered principally with poplar, whitewood, tamarac, spruce, and balsam, with in places a thick maple undergrowth.

No indications of the presence of any minerals were observed. The geological formation is principally Huronian.

Along Lake Temiscaming a number of settlers have entered and taken up claims for settlement. On lots twelve and thirteen, in the third concession, C. C. Farr has a clearing of about thirty acres, with a very substantial hewed log house and barn on it. The crops on this clearing looked very well. C. C. Farr has also purchased the mill property and lot fourteen in the second concession from Mr. Piche. This property is a grist mill in good working order, and also a saw mill which will be a great convenience to settlers.

The best mode of access to this township at present is by way of Lake Temiscaming Colonization Company's steamers and tramways up the Ottawa River from Mattawa.

Accompanying this report are plan and field notes of the survey, which I trust will meet with your approval.

I have the honour to be, sir,
Your obedient servant,

(Signed) C. D. BOWMAN,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 36.*)

DISTRICT OF NIPISSING.

Township of Hilliard.

Eganville, Ontario,
October 28th. 1887.

Sir,—I have the honour to submit the following report of the survey of the Township of Hilliard, surveyed under your instructions, dated May 31st, 1887.

I proceeded by way of Mattawa and Lake Temiscaming, taking the L. T. C. R. at Mattawa. Through the kindness of the agent, Mr. Bouilleaux, myself and party were landed at North Temiscaming, about three miles up the Quinze River. The next day we went by way of La Chenaille du Diable and the Blanche River into the Township of Hilliard, and proceeded to make the survey in accordance with instructions, beginning actual operations on July 26th, 1887.

As to the agricultural capabilities of the Township of Hilliard, I feel safe in predicting that at no distant day it will be second to none in the Upper Ottawa valley. The soil in the uplands is a sandy friable clay, easily worked and capable of producing large crops, while in the swampy portions the soil is a tenacious clay covered with a rich vegetable mould, varying in depth from three to fifteen inches, and absolutely free from stone.

The south western and part of the western portion of the township, is a plateau rising about fifty feet above the surrounding country. It appears to be an extension of the ridge that starts from Wahbe's Point on Lake Temiscaming. Although somewhat broken by gulleys, the soil on the plateau is of an excellent quality, and comparatively free from stone. and yields a dense growth of large timber, such as white pine, birch, poplar, tamarac, spruce, cedar, etc.

The timber east of the Blanche River, with the exception of a strip a few chains in width along the banks of said river, and part of lot number twelve, in concessions three, four and six, is a dense second growth of willow, poplar, tamarac and spruce of no commercial value. Whereas a large portion of the township lying west of the river is covered with a luxuriant growth of large and valuable timber, spruce, tamarac, cedar, poplar and white pine predominating.

The Blanche river enters the township in lot number five, concession six, and flows south easterly crossing the east boundary on concession one. It has an average width of about four chains, and is, I consider, navigable, even in dry seasons, for vessels drawing eight feet of water or under.

The water appears to rise very high in the spring, as there are ice marks on the trees fully fifteen feet above low water mark, The rate of the current depends entirely upon the volume of water passing down. In September, low water, it had a mean velocity of about one mile per hour, while in July it was fully two miles per hour.

The eastern portion of the township is perfectly drained by Otter Skin creek, which is on an average about one chain wide, and from one to three feet deep in low water.

No rock formation of any kind, and consequently no minerals were found during the progress of the survey, although there is abundant evidence of an extensive bed of Bog iron ore in the south-east corner of the township.

The Township of Hilliard is one of the finest fields for sportsmen I have ever seen—mouse, cariboo and bear being very plentiful, while the Blanche River is literally overflowing with the finest fish, such as pike, pickerel, chub, eels, cat and white fish. Some of the catfish and pickerel being of an enormous size.

I have the honour to be, Sir,
Your obedient servant,

(Signed) FRANK PURVIS,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commisioner of Crown Lands.
Toronto.

(*Appendix 37.*)

DISTRICT OF NIPISSING.

Township of Harris.

Clinton, Ontario,
December 31st, 1887.

Sir,—I beg to submit the following report of the survey of the Township of Harris in the District of Nipissing, in accordance with instructions dated May 31st, 1887.

The Township of Harris is situated at the north end of Lake Temiscaming on the Upper Ottawa River, and immediately adjoining the boundary line between the Provinces of Ontario and Quebec, and bounded on the west and north by the Township of Dymond and Casey respectively.

Before beginning my survey I trained my chainmen on the boundary line between the Townships of Harris and Dymond in order to have my chainage agree with that of the outlines.

I commenced operations at the front of the third concession at a post placed by Provincial Land Surveyor Alexander Niven on the line between the Townships of Dymond and Harris, and projected the line in front of the third concession all the way across Wahbe's Point, due east astronomically and then ran the various side lines and concession lines from it using that line as a base for the whole southern and part of the northern part of the township.

With the exception of the low lands at the mouth of the Blanche River and the lowest portions of the lands on the creek emptying into the head of the lake about two miles north-west of the mouth of the Blanche River, the Township of Harris is composed of first class farming lands, being timbered with spruce, tamarac, birch, balsam excellent cedar, a great many of the latter being three feet in diameter and of very fine quality, some hard maple and red and white pine. Wahbe's Point, which runs out into the lake between Wahbe's Bay and the bay at the mouth of the Blanche River, is very high and steep on the east side, one hundred and seventy-five feet in some places, and falls gradually to the west, where the hill on the east side of Wahbe's Bay is not more than thirty feet in average height.

The soil is clay loam and a clay sub-soil Huronian rock underlying, sand loam overlying. Clay sub-soil is found in the north-west portion.

Numerous springs are found along the shores of the lake, and some creeks run westward into Wahbe's Bay.

The Township of Harris, though better timbered, is composed of land exactly similar to that in the township of Duhamel and Guignes on the Quebec side of the lake.

These townships have been under the control of the Lake Temiscaming Colonization Company for some years, and in 1885 there were thirty-seven families resident on their lands, having sixty-seven buildings constructed, and one thousand and ninety-seven acres under cultivation, and as may be seen from the report of the company, the returns to the farmer in this district are just as good as in any part of Ontario. Hay and oats are of course their chief crop at present, as they have no market for other produce. The lumbermen in this district buy all their hay at about thirty dollars per ton, and oats at a correspondingly high figure.

The facilities for reaching the locality, compared with the manner in which the older settlements were populated, are good, but having heard the favourable reports of other surveyors who have been at the upper end of Lake Temiscaming and having a fair idea of the extent of the good land that will be soon opened for settlement, I have no doubt that before long the James Bay Railroad, which is intended to pass near the head of the lake, will be completed, and will be a grest improvement on the present system of transportation, which has too many of the properties of a monopoly to be at all satisfactory, and is not on a large enough scale to be adequate for the conveyance of agricultural products, and again on account of the number of times freight has to be handled and the manner in which such handling is done.

Lake Temiscaming is, I am informed by parties who have resided on it for the last fourteen years, about three feet on an average higher than it was some few years ago. Places on the shore of the lake where hay was cut at that time are now always under water. I have heard a reason given for the rise in the height of the water, but not being assured of its correctness I would not like to place it in this report.

The islands at the mouth of the Blanche River are completely submerged at high water, with the exception of part of the clearing on Rempnouix Island.

At the mouth of the Blanche River, and on both sides of it, the timber is, elm, maple, birch, black and rim ash, spruce and tamarac, cedar and oak, the two latter growing to a large size; further up the river the oak disappears.

The Township of Harris is, I consider, admirably adapted for agriculture and timbered with such woods that render the land easily cleared, and although in the more southerly portions of Ontario land on which tamarac, spruce, balsam and cedar grow is not considered of much value, in this district the reverse holds good. I understand that Mr. C. C. Farr, of the Hudson's Bay Company, contemplates starting a saw mill on the Ontario side of the lake, which will be a great boon to intending settlers, as at present lumber is very difficult to get, although there is now one saw mill near the head of the lake.

The lake and rivers abound with fish and the forests are full of game; at present this portion of the country is a sportsman's paradise.

I have the honour to be, Sir,
Your obedient servant,

H. B. PROUDFOOT,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 38.*)

DISTRICT OF NIPISSING.

Township of Casey.

Clinton, Ontario,
December 31st, 1887.

Sir,—I have the honour to submit the following report of the survey of the township of Casey, in the district of Nipissing, under instructions dated May 31st, 1887.

The township of Casey is bounded on the north by the township of Brethour, on the east by the Inter-Provincial boundary, on the south by the township of Harris, and on the west by the township of Harley. The south boundary of this township is about three miles up the Blanche River from its mouth at the head of Lake Temiscaming. The river traverses it in a south-easterly direction, entering at the north-west angle and leaving about three-quarters of a mile west of the south-east angle.

Having the boundaries of the township surveyed by your department greatly facilitated the work of sub-division.

I trained my chainmen on the south boundary, having them chain about two miles westerly from the Blanche River, so that by making the proper allowances, I was able to have the chainage in the interior of the township agree with that of the boundaries.

Operations were commenced by running the meridian north from the south boundary and by turning off angles from the posts planted by Provincial Land Surveyor A. Niven on the east boundary. Three observations were all that I found necessary to take in the survey of the township.

As instructed, I examined all the stone monuments planted by the Boundary Commissioners on the Inter-Provincial Boundary, between the provinces of Ontario and Quebec, for the six miles that it forms the easterly boundary of this township, and found some of them down which I straightened up in place and fixed as firmly as possible—the stones being so short, however, that to do the work properly they would have to be sunk out of sight in the moss and soft and wet black soil.

With the exception of a few hundred acres of high land in the south-easterly portion of the township, the land is a level flat, mostly spruce and tamarac swamp, in some places very wet and in others nearly dry ; but all excellent agricultural land, as I did not see any that could not be easily cleared and drained. In fact, I think that most of the swamps are caused by the extra height of the land on either side of the present drainage outlets—the Blanche River and its tributaries—into which the whole township could be easily drained.

The subsoil is clay with good clay loam and black muck overlying.

The hills shown in the first and second concessions are very stony, with a slightly sandy soil, the top of the hill the second concession being almost bare rock.

I consider the township well adapted for agricultural pursuits, and with the facilities afforded by the Blanche River, one of easy access to intending settlers.

Accompanying this report are the plan and field notes of the township.

I have the honour to be, Sir,
Your obedient servant,

(Signed), H. B. PROUDFOOT,
Provincial Land Surveyor.

The Honourable T. B. Pardee,
Commissioner of Crown Lands,
Toronto.

(*Appendix No. 39.*)

REPORT

OF

THE SUPERINTENDENT

OF

COLONIZATION ROADS.

To the Honourable T. B. Pardee,
Commissioner of Crown Lands,
Ontario.

Sir,—I have the honour to report the work accomplished under the Colonization Roads' branch of your Department during the year 1887, and which embraces more than one hundred and sixty undertakings in various sections of the Province.

The departmental expenditure was $122,974.78, for which sum 200 miles of roads were constructed and 394 miles repaired, besides the building of 20 bridges of various sizes and the repairing of about 25 others.

As the sum granted by the Legislature for the works of 1887 was $117,550, the over-expenditure will be seen to be $5,424, and was largely on account of extra work due to damages to bridges and roads by bush fires, and in some cases spring floods.

The following are the works :—

NORTH DIVISION.

Base Line Road.

A work on the line between the townships of Prince and Park, amounting to one mile and a half of construction.

Basswood Lake Road.

Continued from last year's operations along the west side of the Mississaga River to the line between lots two and three, in Wells township ; thence north to the third concession, and thence again west, to lot number seven, a distance of between four and five miles.

There remains yet about one mile of construction in order to reach its point, Grand Portage Road, which should be finished next season.

Bright and Gladstone Road.

A work to connect the two main roads in that part of the Bruce Mines District, namely : Thessalon Road and Mississaga Road.

It is two miles in length beginning at the south end of lots three and four, of concession six, Bright township, and continued from thence north, half a mile to Mud Creek, which was bridged with a structure eighty feet long, and the road produced northward through the sixth concession, and the first concession of Gladstone. A most useful road.

Clark's Bridge.

This structure is now in course of building, but not yet completed.
It is over the Thessalon River, on the Rose and Lefroy Road.

Cockburn Island Roads.

About four miles of repairs, and a mile and a quarter of new road, were made on the Island, on three different roads; the first being upon what is known as the twelfth line, which was repaired over two and a half miles; secondly, the fifteenth side line, which was a mile and a quarter of new work; and the last, about a mile and a half of repairs, on the tenth side line; a large amount of work for the money spent.

Coffin Road.

Of the grant of $1,000 made last Session for repairs, only about $350 were spent upon it, as the condition of the road from Otter Tail Lake to Bruce Mines, and which is a continuation of the above road, required a considerable outlay to make it fairly passable. The greater part of the balance of the grant was therefore used for this purpose.

The length of these repairs was in all about nine miles, or four and a half miles upon each road.

Coyne's Road.

A road commenced in the year 1885, at the south boundary of the township of Rose, and continued each following season.

It is now over ten miles in length, having been built this year to the third concession of the township of Galbraith, three miles; its course being north, or parallel with the township lines, from the end of last year's work.

Grand Portage Road.

Extended this season two and a half miles, namely, from the south half of lot nine, concession four, Wells township, northward three-quarters of a mile; thence eastward half a mile; thence again north half a mile; thence eastward a quarter of a mile to the river; and from thence again north half a mile.

Of the grant, $35 were spent in repairing the portion made last year.

Great Northern Road.

Repairs were made upon this road in connection with those on Coffin Road and that from Bruce Mines. Heavy traffic and teaming in consequence of railway construction made these improvements necessary, as the roads were reported in many places impassable. These repairs extended over four and a half miles.

Huronian Mines Road.

This is a highway into the township of Moss, to assist in developing mining and agricultural industries in that region, and to enable mining operators to get in supplies, material and machinery for developing the mines. The road is from Barril Portage on Lac des Milles Lacs to a point about one mile south of Iron Lake, in the above named township, a distance of fourteen miles. There are yet nearly five miles to construct before the mines are reached, but it is understood that from the end of the present road the mining companies will for the present make, at any rate, winter communication with the mines.

The first seven miles of road made are through a rough broken country, but the remaining distance is through a better district, containing some very fair agricultural land.

MANITOULIN ISLAND ROADS.

Thirteen miles have been constructed and thirty miles repaired on the Island, upon eighteen different roads, namely :—BARRIE ISLAND ROAD AND BRIDGE, upon which $115 were expended in opening up the road allowance between lots 5 and 6, in the third concession of Barrie Island, to meet the road to the bridge which connects with Manitoulin Island, a distance of one and a quarter miles; and upon the bridge $160 was spent in repairing and strengthening it.

On the BIDWELL AND GREEN BAY ROAD, two and a half miles of repairs were made, and the connection between Manitowaning and Green Bay thereby very much improved. Again, on the CLOVER VALLEY ROAD, three different sections were wrought over, one being half a mile of new work to avoid a bluff rock on lot 28, concession 6, of Assignac; the second being the improvement of a steep hill on TEN MILE POINT ROAD; and thirdly, the removing of rock, with other repairs, near Shequiandah Village. For this work the municipality gave $25 in cash and an equal sum in labour, so that the cost to the Department is only about $128.

The GORE AND PROVIDENCE BAY ROAD was repaired over three miles in the Township of Campbell, at a cost of a little above $300; and the KAGAWONG AND MCARTHUR ROAD was made anew from the Gore and Providence Bay Road, on lot 19, concession 2, Campbell, easterly through lots 18, 17 and 16 to the town line of Allan township, a length of nearly a mile and a quarter, at a cost of about $116.

The LAKE WOLESLEY ROAD, at a cost of $1,000, was made between concessions 11 and 12 of Robinson, from lot 21 to lot 32 inclusive; and five miles were repaired in the townships of Mills and Burpee; while on the LITTLE CURRENT AND WEST BAY ROAD, repairs costing $340 were extended over three miles of the road, from lots 20 and 21, concession 10, of Bidwell township, westerly.

MILLS (7 AND 8 CONCESSION) ROAD was constructed from the road allowance between lots 10 and 11, westward two and a half miles, at a cost of $470; and MILLS (10 SIDE LINE) ROAD was made through the seventh and eighth concessions a mile and a quarter, for about $120.

MINDEMOYA ROAD is one and a quarter miles, constructed between lots 15 and 16, through concessions 5 and 6, of Carnarvon township. It was at one time thought impossible to make a road on this line, but deep ditching and draining has made an excellent road, although at greater cost than usual, the outlay being a little over $700.

About three-quarters of a mile was also built on what has been called MINDEMOYA AND EAST SHORE MCPHERSON ROAD, and being from lot 23, concession 10, Carnarvon, southerly along the Lake Shore, so as to connect with West Bay Road. This latter work cost $115.

On MUDGE AND WEST BAY ROAD work was done in two sections, one portion being through concessions 10 to 14 inclusive, of Billings, and between lots 20 and 21, and the balance on lot 12, in improving a hill known as "West Bay Bluff;" the whole representing three and a quarter miles of repairs, costing $230.

A bridge over a stream on lot 5, concession 10, Gordon, was built, and half a mile of road improved, for the sum of $170, the work being designated NORTH OF SCOTLAND ROAD AND BRIDGE.

PROVIDENCE BAY ROAD was repaired from Manitowaning and Michael's Bay Road, westward towards Providence Bay, at a cost of $400 for the eight miles wrought over. The fires of 1886 had destroyed nearly all the bridges and crossways on the road, but the outlay this year, and nearly an equal amount last year, has restored the road and made it again travelable.

Another work, called PROVIDENCE BAY BRANCH ROAD, is that between lots 10 and 11, of Carnarvon, from the Providence Bay Road southerly to the thirteenth concession, one and a quarter miles, and cost about $100; and again, on SANDFIELD (2ND AND 3RD CONCESSION) ROAD, from lot 7 to lot 14 both inclusive, one mile was constructed and one repaired, at total cost of $330.

Sucker Creek Road is a small work begun between concessions 4 and 5, of Howland, and continued southward between lots 25 and 26 to concession 2; and from thence westward to lot 28, one and three-quarter miles of a road, which the settlers had cut out some years ago. The last mentioned work cost $100, and finally $70 were spent on the road allowance between lots 15 and 16, of Tehkummah, in repairing two and a half miles, from Manitowaning and Michael's Bay Road, northward.

Mississaga Road.

This road is from Blind River, Bruce Mines District, to the Mississaga River, in a pretty direct line, a distance of about four miles; and from thence it follows up the stream on its easterly side, and is now within five miles of the Mississaga River iron bridge, built last year. This season twelve miles were constructed, leaving five yet to be made. It is a most valuable road for all general purposes, and should be completed next season.

Parkinson Road.

This road was continued a further distance of two miles from the end of last year's work, now terminating in the first concession of the township af Parkinson, and between lots 4 and 5. The work was excessively heavy.

Point De Meuron Road.

Six and a half miles opened from Murillo Road to about a quarter of a mile west of Slate River. It became necessary to spend more than the grant made for this work when it was found that until Slate River was reached and bridged, settlers could not avail themselves of the road.

Rabbit Mountain and White Fish Lake Road.

Ten miles of this road, which, in my report last year, I mentioned as having been cut out sufficiently for winter traffic, have this season been completed as a good waggon road to Silver Mountain.

A branch road three and a quarter miles long was also made from the main road into Rabbit Mountain upon a location in Paipoonge, examined and selected as most suitable in the interests of agricultural as well as mining interests. It is from the 7½ mile post northward approximately on the line between concessions C and D, and while an excellent location it was expensive to build, being heavily wooded.

The Rabbit Mountain Mining Company gave a cash subscription of $800 towards this branch road.

Rainy River Road.

A little more than fourteen miles of road have this season been made, following generally the original survey and location to about three miles below what is known as Pither's farm, on Rainy River.

Through the Indian reserve, contracts were given to the Indians, and the work is said to have been well performed by them.

Rat Portage and Keewatin Road.

Over two miles of road made from Keewatin towards Rat Portage as a good waggon road. It is mostly on the north side of the Canadian Pacific Railway line, but crossing the track near Bulmer's Mills to unite with the pier bridge which was built last year over one of the mouths of Winnipeg River.

Rock Lake Branch Road.

About one mile of road on the sixth concession line of Plummer, in the Bruce Mines District. A small balance is still due on the work.

Spanish River Road.

A small grant given to open a road in the township of Shedden to the railway. The work was begun late in the fall, and is not yet fully reported upon.

St. Joseph Island Roads.

For the expenditure of $2,653.58 six miles of road have been well constructed and half a mile repaired, the works being the following:—V and I line, where work was begun at the Hilton Road between lots 1 and C of concession 17, and from thence northward between these two lots and through the said concession, thence westerly between concessions 5 and 17 to that between V and K thence northward in a right line to the north angle of lot 25 concession I, and thence south-westerly between concessions H and I to lot 20, meeting the work of last year, and thus opening a road through a good section of country and an important one for the people. Its length is three and three-quarter miles, costing $1,640.

A second work is on D line, which was repaired through concession A, and opened through Huron concession, the road itself being between lots 15 and 16 of these concessions, and costing about $480 for half a mile of new road, and a little more than the same length of repairs.

The third work was on the A line, along the westerly limit of concessions I and K, and is one and a quarter miles of new work made for $520.

The work on the Island is spoken of in the highest terms of praise.

Thessalon Road Bridge.

This is the bridging of a very bad ravine near the railway crossing at Thessalon. The structure is crib work abont 100 feet long and 15 feet high in the centre. The cost is $397.50.

WEST DIVISION.

Ah-mic Lake Bridge.

This bridge is built upon a site selected, after careful examination, as in every respect the cheapest and most desirable in the interests of the district and settlement. It is across the "Narrows" between Ah-mic and Neighic Lakes on lot 15, concession 5, of Croft. The bridge is 207 feet long, having two main openings of 50 feet each, and is high enough above the water to allow navigation between the two lakes. The cost is a little over $800 for the structure, and, with the balance of the apropriation, about a mile of road was opened to the bridge. A balance is still due on account of $280, or thereabout.

Alsace Road.

This road is now opened from the Rossean and Nipissing Road to Himsworth Station, on the Pacific Junction Railway, and will be of immense value to a large district. The work this year was between lots 25 and 26 through concessions 11 and 12 of Himsworth, and from thence east between concessions 12 and 13 towards Powassan, and to a bridge built by the Department about five years ago. The length made is two miles.

Baxter Roads.

The sum of $500 was spent in making repairs over six and a half miles of roads which lead to the settlers of the township of Baxter.

Black Creek Bridge.

In consequence of defective approaches this bridge was not available for traffic, but it is now put in good order, and at the small cost of $70. It is on the Peterson Road, in the township of Oakley.

Booth's Bridge

Is over a stream on the Westphalia Road, and on lot 4, concession 3, of the township of Gurd. It was originally built by the settlers, and, therefore, as may be supposed, was neither elegant nor durable. It was carried away by the spring floods, and traffic on that portion of the road suspended. The new bridge is a substantial one, in length 100 feet, with a centre span of thirty-seven feet. Ninety feet of approaches averaging a depth of five feet were also made of permanent material, so that the total cost, $383.83, is remarkably low.

Brennan's Bridge.

When completed, this bridge will be mainly an 80-feet Queen post truss, and about 120 feet in length over all. It is now being built over South River, on lot 6, concession 14, in the township of Joly, as a portion of Eagle Lake Road, for which $800 was granted last Session; but owing to the difficulty experienced in deciding upon a satisfactory location, the work was delayed.

Bridge Repairs (Parry Sound District).

Ten bridges were repaired for the sum of $1,356.34, namely:—Powassau bridge, at a cost of $115.46; South River bridge, $256.16; one on the Rosseau and Nipissing Road, $71.97; one on the North Road, for $87.67; that called Nipissing bridge, costing $430.15; Boyne Creek bridge, at an outlay of $43.22; a small one on Strong, 30 side line, for $21.24; another at Dunchurch, for $12; a pretty large one built anew at Commanda, on the Rosseau and Nipissing Road, for $282.34; and one called Barrett bridge, repaired for $36.13. The work in all these cases was done to save the structures and preserve traffic over the roads.

Brunel Road.

Repairs on this road from the road allowance, between lots 15 and 16, Brunel, to lot number 23, a length of nearly two and a half miles. The work, as reported, was heavy and expensive, and that an excellent job was done. The road leads to the Utterson Station on the railway, which is the station for a large district.

Burk's Falls Road.

Two miles of substantial repairs were made from lot 14 to lot 22, between concessions 8 and 9, of Armour township, and which had previously been roughly opened up by the inhabitants. In addition, one and a half miles were built, from the above named lot 22 southerly through lots 23 and 24 to the blind line, between concessions 7 and 8; and from thence, eastward on the said blind line to lot 27. An over-expenditure of nearly $150 was incurred in order to complete the road through a bad swamp, so as to let settlers out and in.

Burk's Falls Station Road.

A road connecting between the railway station and the steamboat landing at Burk's Falls. The grant was made to supplement the efforts of the residents who had spent a good deal of money upon the road, but in consequence of a bridge over the Maganetawan River, which required a considerable sum to repair, they represented themselves as unable to compiete the work. They, however, contributed and handed over to the Department

$100, in order to finish and open the road sufficiently for traffic. The Departmental expenditure is therefore about $400, including the bridge repairs.

Burpee Road,

Which is a continuation of that commenced a few years ago, was this year begun on lot 11, concession 8, Ferguson township, and continued north to the town line between Burpee and Ferguson; and from thence, again northward through lots 10 and 11, concession 1, Burpee, and part of lot 9, in the second concession—a length altogether of two and a half miles. The road now ends at the mouth of Shawanaga Lake.

Carling Road,

Produced from where work ended in 1884, namely:—Lot 19, in the second concession of Carling, westward to lot number 30, between the first and second concessions—a length of three miles. The construction upon the blind line was found to accommodate settlers better than by following the road allowance.

Cardwell Junction Road.

Two and a half miles repaired, including a deviation of half a mile. The work was from lot number 4, in the first concession of McMurrich, to lot number 6, on the town line between Perry and Chaffey. This is an important highway, and ought to receive a grant of about $800 to properly open the road to Novar station, on the Pacific Junction Railway.

Carrington Road.

A little over a mile and a half was built in this instance, beginning between lots 30 and 31, in the tenth concession of Foley, and extending southward to the eighth concession; and from thence through lot 30, the balance of the length wrought over. The road begins about two miles east of Parry Harbor, and was opened many years ago as a winter road.

Christie Road.

This work was chiefly the building of a bridge or high crossway over Ten Mile Creek, a tributary of the Saugeen River. The length is 395 feet, and it is elevated about five feet above the ground so as to avoid damage by flooding.

Dee Bank and Three Mile Lake Road.

This is largely a bridge work, and cost more than the estimated value on account of the difficulty in procuring sufficient timber. The bridge, with approaches, is 111 feet long, and the whole work is of a most permanent character.

It is about lot twenty-three, between the eighth and ninth concessions of the township of Watt.

Distress River Road.

This is the production easterly of the road between concessions ten and eleven, of Joly, from lot thirteen to the Joly Road, between lots fifteen and sixteen, to connect these two roads and make each available for traffic. The length made was three-quarters of a mile, and is a very useful work.

Draper and Gravenhurst Road.

This road is between lots five and six of Draper township, and the work this season was from the road allowance between conce sions five and six southward to the township

of Ryde. This portion of road, four and a half miles long, had been made by the Government previously, but was in an unfinished condition, and very much out of repair.

Eagle Lake Road.

A grant of $800 was given for this road, but was not expended in the way contemplated, on account of the difficulty experienced in deciding upon a location which would best serve the public and advance the settlement of the district.

During the delay, Eagle Lake Bridge, which is upon the same road, became damaged and required the expenditure of $88.75 to repair it; and at a later date it was decided to build a bridge over the South River with the balance of the appropriation, and which is specified in the report under the title of Brennan's Bridge.

As a fact, two settlements should be developed, and one road cannot satisfy the requirements, on account of the difficulty, or rather the cost of building bridges over the river, so that more money is evidently wanted to meet the circumstances.

Ferguson Road.

A road began last year on the Lorimer Lake Road, and this season commenced on the Northern Road, and made to meet the previous season's labours.

It was begun on the Northern Road at lot nineteen, road survey of McKellar township, and continued from thence across lots thirty-three, thirty-four and thirty-five, of concession eleven; thence northerly on the town line between Ferguson and McKellar to the road allowance between concessions four and five of Ferguson; thence westward across lots one, two, three and four; thence northward on lot five to about its centre, and from thence west to lot six, where it joins the Lorimer Lake Road, on concession five, a length of four miles, of which three were new, and one mile of repairs. This road is reported as a most valuable one.

Golden Valley Road.

A mile and a half of new and very permanent work, produced from lot number thirteen to lot nineteen, between concessions eight and nine, of the township of Mills; and in addition the road was chopped out and cheaply graded as far as the Mills Road, on lot twenty-five, concession ten, so as to make a connection, and allow settlers its use, for winter purposes at any rate. A farther expenditure is requisite to complete the work, as it is an important highway for a large district.

Hagerman and Croft Road

Is on the town line indicated by its name, and was built or improved from Junction Number Three, or Ah-mic Harbor Road, southward, one and a quarter miles. To increase its value to settlers it should be continued at least three miles further, to the Croft Road.

Himsworth Road.

The Himsworth Road proper, which is on the road allowance between lots twenty and twenty-one, of Himsworth, was improved through concessions thirteen and fourteen, chiefly in fixing bridge approaches; the balance of work being the opening and improving of the road between concessions twelve and thirteen of Himsworth, and four and five of Nipissing, from lot twenty-five, of the first named township, westward, to lot six of Nipissing, uniting at this latter point with the Muskoka Road, and opening a fair line from Nipissing Village to Powassan and the railway.

Himsworth No. 2 Road.

This is a most important connection between what is known as the Gurd Settlement and the Westphalia Road, near Trout Creek Station of the Pacific Junction Railway, and I believe will be the means of rapidly developing portions of the township of Himsworth.

The road is between lots twenty-five and twenty-six, through concessions three to six, both inclusive, a length of two and a half miles, about one-half of which was a heavy, wet swamp, which had to be ditched and crosswayed throughout.

Joly Road.

Constructed between lots fifteen and sixteen of Joly, from Distress River Road, (between concessions ten and eleven), southward, two and a quarter miles. South River crosses this road and was bridged with a very substantial structure, but at a cost of nearly $200 above the original grant.

Junction No. 2 Road.

Work begun in the tenth concession, between lots ten and eleven, of Humphrey, and repairs extended north to the town line of Christie, other repairs were made from lot eighteen, concession one, Christie, northward, to Maple Lake, concession four; in all a distance of five miles. It is a most useful road.

Junction No. 3 Road.

This short road of four miles is an important one, being the only way to Ah-mic Harbor, the steamboat landing and business artery of a large district. It was well repaired throughout at the small cost of $503.97.

Kearney No. 2 Road.

Made on the town line between Proudfoot and Bethune, from lot nine to the centre of lot sixteen, a length of two miles.

Deviations were made from the town line which passed through lots thirteen, fourteen and fifteen, of concession one, Proudfoot.

This road should be continued eastward.

Lake Shore Road.

This was little more than a trail, through a rough and broken country, and is from lot thirty-two Monck, through a route selected by the municipality to the Port Carling Road. The length made was three miles, and reported as being well done and of value to certain settlers, who are now able to reach the lake navigation.

Leg Lake Road.

This road is one from the Musquosh Road westward, into the township of Wood, beginning about lot twenty-eight of Muskoka township, and ending on lot number three concession thirteen, of Wood township, passing through lot D of the same concession.

The object of the work is to reach what is known as Patterson's Settlement, and which is about three miles west of the present terminus. One and a-half miles were made this season, and the first portion of the road somewhat improved. The whole road is through a generally rough and broken district.

Macaulay Road.

Repairs between Baysville and Bobcaygeon Road from lot 26, concession 9, to lot 20, concession 11, Ridout, three and a-half miles. The road is a valuable one, but was almost impassable before this year's outlay.

Maganetawan Road.

About four miles of repairs made from lot number 6, of Strong, to lot number 12, of Ryerson or Chapman, the road being practically on the town line between the townships last named.

This work was exceedingly heavy in consequence of the stony character of country, but was well done throughout, as I can testify from personal inspection.

Manitowaba Bridge.

A new bridge over the North Seguin River, or outlet of Manitowaba Lake, and is on lot 35, concession 4, of McKellar.

The structure is 180 feet long, comprised of six spans or openings, the greater one being 40 feet. The original bridge was built about twenty years ago, and was entirely worn out and unsafe. This bridge is on the line of Junction No. 2 Road.

Mills and Wilson Road.

Work was begun on the town line between Mills and McConkey, on lot number 6 and the road constructed from thence westward to lot 17, which, with the deviations from a straight line, makes a length of three miles.

It is through a fair settlement, and opens up a good district for agricultural purposes.

The deviations above mentioned are on lots 13 and 15, of Wilson; in one case to avoid a heavy swamp, and in the other a large rock.

Monck Centre Road.

This road is between lots 15 and 16 of Monck township, from the north town line southerly. It was a heavy and expensive piece of work throughout, and the grant was insufficient to complete it to the Lake Shore Road as was intended, while that now made, one and three-quarter miles, is valuable to those living in the township of Watt.

Monck 5 and 6 Side Line Road.

A small grant was given to assist in opening this side line from the Port Carling, Road to the 11th concession, and from thence eastward to the concession line across lots 5 and 4, about half a mile.

Monteith and Perry Road.

The westerly portion of this road was changed last year, for three and a-half miles, in order to avoid a rough, impracticable part.

Two miles and a-half of this distance were, this season, made into a good general road, leaving the balance yet to be finished.

At the east end of the same road an extension was made eastward into Bethune of nearly one and three quarter miles, namely, from lot 26 to lot 31, and on the road allowance between concessions 10 and 11, or nearly so.

Muskoka Road.

Work begun at Eagle Lake Road, which is at this point between concessions 2 and 3 of Machar, and built northward on the side road between lots 10 and 11, one and a-half miles; after which, for the purpose of making the work available to settlers, the 4th and 5th concession line was opened westward one and a-quarter miles.

The first portion was work of the heaviest description, costing much above the usual rate per mile, and therefore almost beyond the ability of settlers to construct.

In the township of Morrison, the sum of $340 was given to assist in repairing bridges along the road, and in some cases renewing them altogether. This latter expenditure was made under the management of the municipality, and is understood to have been very well performed.

Musquosh Road.

Repairs were made over three different portions of this road, consisting chiefly in renewing some forty rods of crossway and raising the road bed in various places above high water, so as to avert the annual flooding which used to occur. The Muskoka Mill and Lumber Company contributed the sum of $66.50 in cash towards the repairs.

New Jerusalem Road.

A new work commenced at the Rosseau and Nipissing Road on lot 154; thence through this lot to meet the road allowance between concessions 12 and 13, on lot 5, of Lount; thence through lots 5 to 1 inclusive, in the 13th concession—a length of about two miles. The work throughout was heavy and expensive, and although an additional $200 was given, it has not yet reached the settlement which the work is intended to serve, and should be produced yet farther eastward.

Northern Road.

Four miles repaired from Waubamic to the town line of McKellar, and the work highly spoken of.

North Ryerson Road.

Repairs made over three miles, from Spence, on the Rosseau and Nipissing Road towards Midlothian, in the townships of Spence and Ryerson.

Nosbonsing Road.

The object of this work is to give the settlers at Nosbonsing Lake a road to Callender Station, on the Northern & Pacific Junction Railway, as they are at present without an outlet of any kind except by water. The appropriation of $800 was spent in making somewhat over three and a half miles, beginning on the Nipissing Road at Burford's Creek, about lot 3, concession 16, of Himsworth, and extending towards the lake, on a well selected line through a rough, broken country. The work should be continued.

Orange Valley Road.

Nearly four miles repaired, including repairs to several bridges, which the spring freshets had injured.

Parry Sound Road.

Repaired from near Parry Sound to the road into Port Cockburn, about eighteen miles; the chief work being repairs to bridges, culverts, and upon hills which water had washed out.

Peterson Road.

This work was the removal by blasting of about 200 cubic yards of rock above "High Falls," on the south branch of the Muskoka River, which dammed the water and flooded the Peterson Road to such an extent annually as not only to impede travel, but to make it absolutely dangerous. It is expected that the action taken will largely correct the above difficulty. The municipality of Draper and Oakley gave $50 towards the work.

Rosseau and Nipissing Road.

$100 spent in making some necessary repairs upon bridges and culverts between Mecunoma and Nipissing.

Ryde Road.

This portion of the Ryde Road is between Rama and Dalton, and has this season been made from the Dalton and Washago Road southward five miles to Head River as a good winter road. A spur one-third of a mile in length was also made eastward between concessions 7 and 8, of Dalton, into a settlement of fifteen to twenty families. This is an important connection and will save a great many miles of extra travel to the settlers.

Ryde Centre Road.

This road is between lots 5 and 6 of the township of Ryde, and the season's work the construction of two and three-quarter miles through concessions 3 to 10. In this, as in many cases this year, bush fires which were so prevalent, caused the loss of much time in protecting bridges and crossways and sometimes protecting settlers in their homes.

Seguin Falls Bridge.

This bridge, with another, called Seguin River Bridge, are two structures on the Rosseau and Nipissing Road which were substantially repaired. The first being raised nearly four feet on account of high water and flooding, and the second replanked and otherwise renewed.

Sinclair Road.

Repairs on the southerly end of this road, beginning at the Muskoka and Bobcaygeon Road, and being through concessions 2 to 5 of Sinclair.

Stephenson Town Line Road.

An expenditure of $85 incurred in taking out timber and iron of a bridge on this road which fell into the water, and which it was thought well to save.

Stisted Swamp Road.

Eighty-five rods of crossweying built opposite lots 5 and 6, between concessions 4 and 5 of Stisted. The money devoted to this work was not sufficient, but the settlers assisted in the completion of the crossway.

Trout Creek Bridge.

A bridge over Trout Creek, on the line of Westphalia Road, lot 33, concession 3, Himsworth. It is 150 feet long with a main span of 80 feet in the clear. The abutments are 10 feet by 16 feet, and 17 feet high, filled with stone. The inspector says it is without doubt one of the best bridges in the district.

Westphalia Road.

The work this season was begun at the railway—lot 24, between concessions 2 and 3 of Himsworth, and continued between the two concessions named, westward to lot 29, when in consequence of the impracticability of the road allowance the road was diverted northerly, passing through the fronts of lots 30, 31, 32 and part of 33 to Trout Creek, where a bridge was built, and more particularly referred to under the title of Trout Creek Bridge. It is two miles and a half of heavy work.

This is one of the most important roads in Parry Sound District, as when opened westward to meet the portion now built it will be a leading highway for a great many townships.

EAST DIVISION.

Addington Road.

Eleven miles of repairs made, from the village of Cloyne southerly, within three miles of the Canadian Pacific Railway crossing of the road. This portion is now said to be in splendid condition.

Upon the road north of Massanoga Lake, three bridges were repaired, one being over Mallory's Creek or Mill Stream, which is really a new structure one hundred feet long; the others being that over Massanoga River and one over Louse Creek. About half a mile was also made as a diversion of the Mississippi Road.

Admaston Road.

Work from Richardson's Mill, lot number 8, concession 2 of Grattan, to lot 19, concession 10 of Admaston. Four miles of repairs.

Algona and Hagarty Road.

From about five and a half miles west of Eganville repairs were extended some six miles westerly.

Algona (Telegraph) Road.

Three and a half miles repaired from five and a half miles west of Eganville in a south-westerly direction over the road.

Anstruther Road.

This road, which is in reality a diversion in lieu of the Burleigh Road, was begun about four years ago. This grant was used for general repairs over its whole length of about eleven miles.

Beachburg and Cobden Road.

A road leading from the Village of Beachburg, in the township of Westmeath, to the Village of Cobden, on the Canadian Pacific Railway, ten miles in length. Three miles of this length were repaired from Beachburg south-westerly.

Bear Lake Road

Is on the tenth and eleventh concession road of Glamorgan, extending from the Burleigh Road easterly. The length made is one and three-quarter miles, which may be called new work, as previously it was but a settlers' trail.

Bobcaygeon Road.

From Kinmount northward fire had almost entirely destroyed several miles of the road, rendering traffic impossible, and the expenditure made was an absolute necessity. The repairs, or more properly renewals, were between Kinmount and Minden, three miles, and north of Minden two and a half miles—the former costing a little less than $800, and the latter about $470.

Bonnechere River Road.

A road on the north side of Bonnechere River. The portion made this year is new, and made first from Eganville to the sixth and seventh concession line of Wilberforce a mile and a quarter; and again, on the last named line, from that between lots 8 and 9 easterly half a mile.

Bromley 9 and 10 Side Line Road.

This work is on the side line indicated through concessions 6, 7, and 8, two miles, chopped 30 feet wide, grubbed and graded.

Buckhorn Road.

This road was repaired in three different sections, as follows:—1. Five miles and three-quarters on the town line between Glamorgan and Cavendish, which had become overgrown with small timber and brush shutting out wind and sunlight, both of which are necessary for roads at any rate. The above cost $400.

2. Repairs were made from the Monck Road southerly through six concessions in the township of Smith, a distance of nearly five miles, costing $768.22, of which amount the municipality of Smith contributed $250 and the county of Peterborough a like sum.

3. In consequence of the destruction by fire of some crossways and bridges, it became necessary to repair them in order to maintain traffic, and which was done at a cost of $189.50.

Burleigh Road.

The principal work in this instance was the building of a bridge over Eel Creek, near the Village of Apsley, with another, about nine miles south of the village, at what is called "The Depot." They are each the same style, namely, main span 36 feet on piers 9 feet high, and total length of 56 feet with good earth approaches.

Burnt River Bridge.

A bridge on the Buckhorn Road, in the township of Dysart, built to replace one destroyed by fire and entirely stopping traffic. The present structure is 210 feet long, of cedar throughout.

Callender Station Road.

Continued from last year's operations southerly, between lots 30 and 31 of Bonfield to the line between concessions 5 and 6—two miles of new road, chopped 30 feet wide, and grubbed and graded.

A bridge 85 feet long, built over Spark's Creek on the line of road, is included in the expenditure of $517.90.

Cavendish Road.

Repairs made from the point of division between lots 15 and 16, on the road allowance between concessions 13 and 14 of the township of Galway, and continued along the last named road to lot 19, a length of one mile of well built road.

Chalk River Road.

Upon examination, the road upon which it was intended to spend this money was found to be impracticable, and the inspector, after looking fully into the subject, recommended the improvement of the main road. This was done, and the Pembroke and Mattawa Road was repaired from lot 36 to lot 43, of Range A, in the township of Buchanan—two miles.

Chandos Road.

Repaired from Apsley, on the Burleigh Road, eastward seven and a half miles.

Chandos and Wollaston Town Line Road.

Two miles of repairs from the north-west angle of Wollaston, southerly between it and Chandos. It was chopped out three years ago, but was not grubbed or graded, as it now is. The counties of Hastings and Peterborough each gave $50 towards the above, so that the Government outlay was only $100.

Cobden and Eganville Road.

Work commenced at Cobden Station, and repairs made to the town line between Ross and Bromley; and thence along the road between lots 15 and 16 to concession 8, a length altogether of seven miles.

Combermere Bridge.

Repairing and replanking the large bridge over the Madawaska River, at Combermere.

District Line and Douglas Road.

Repairs from lot number 8 to lot 13, in concession 9 of Bromley—two miles.

Dungannon Road.

This is the fourth and fifth concession line of Dungannon, and was repaired from the Hastings Road eastward to lot number 19, two and a quarter miles; besides three-quarters of a mile constructed farther to the east on the same line.

East Stanhope Road.

The construction of three and a quarter miles of road from Black River Bridge, which is on the road between concession 3 and 4, and between lots 15 and 16 of Stanhope, north to the sixth and seventh concession line, and from this latter point west about a quarter of a mile.

Eganville and Foy Road.

Repairs over four miles, from half a mile west of Eganville to Delaney's Bridge, and the road said to be now in good condition throughout.

Golden Lake Bridge.

Some necessary repairs to the approaches and to the covering and railing of this structure, which is at the foot of Golden Lake, in Renfrew, and built by the Department about six years ago.

Gooderham Road.

A work on the line between concessions 5 and 6 of Glamorgan, from the line between lots 15 and 16 to that between lots 18 and 19, or from Monck Road eastward. It was a rough settlers' road, and much requiring this small expenditure over its length of four miles.

Haley's Station Road.

A road from Haley's Station, on the Canadian Pacific Railway, to Portage Du Fort. It is six and a half miles long, and was more or less repaired over its entire length.

Harvey Road.

One mile of a new road, beginning about five and a half miles east of Bobcaygeon Road (lot 21, con. 14, Harvey), and extending easterly.

Hastings Road.

The repairs on the Hastings Road were begun at Rathbun Station, and continued northward sixteen miles, to about one mile north of the Village of Bancroft.

On the St. Ola Road, for which in the estimates a portion of the grant of $1,000 was given, there was made travelable, from lot 19, concession 4, to lot 23, concession 8, of the township of Limerick, two and a half miles.

The road itself begins on the Hastings Road, where it is crossed by the Central Ontario Railway, and is from thence south-easterly through the township of Limerick. The road is ten miles long, which has been opened by the settlers, except the portion before mentioned as having been this year wrought over.

Herschel Town Line Road

Commenced on lot 9, concession 16; thence to lot 14, on the same concession line; again beginning at lot 26 on the town line, and continuing to lots 29 and 30 of Cardiff, and known as Deer Lake Settlement—four miles of work over what was previously a rough lumbermens' road.

Hinchinbrooke Road.

One mile of repairs over a rough and rocky piece, from lot 5 eastward on the ninth and tenth concession line of the township of the same name.

Indian River Road

Is on the road allowance between concessions 7 and 8 of Alice; the work this year being between lots 25 and 30. Some 200 pine stumps were taken out, and the mile and a quarter ditched, and graded eighteen feet wide throughout.

Indian River Bridge.

A bridge erected four years ago, but so injured by the freshets and pressure of logs against it as to require this expenditure of $155.97, to make it again secure.

Lapasse and Beachburg Road.

From Lapasse, on the Ottawa River, to Beachburg, in the township of Beachburg, this road was repaired throughout its length of seven miles. It had been roughly cut out some years ago.

Lavant Branch Road.

This work is in the township of Lavant, on the north side of Clyde River, beginning at the boundary between Darling and Lavant on lot 10, concession 1, of the last named township, and from thence in a north-westerly direction, crossing lots 10 and 11 of concession 2, and lots 13 and 14 of concession 3—a length of three miles of what was a sort of shanty road.

Lutterworth Road.

This, with the Lutterworth and Somerville Town Line Road received some slight repairs to crossways and other items, equal to about a mile of repairs.

Mattawa and Temiscamingue Road.

Repairs were made over ten miles of this road between Mattawa Village and Les Arables, on the Ottawa River, and a bridge 150 feet long built over Antoine Creek, according to a sketch furnished the overseer by the inspector.

McClintock Road.

The construction of four miles from lot 11, concession 3, in a north-easterly direction to the line between lots 20 and 21 in the sixth concession, all in the township of McClintock, making, with last year's work, eight miles.

Mississippi Road.

Two principal sections were repaired, the one being three miles of work from where the road intersects the North Frontenac Road westward, and the second, five miles of repairs from the Carlow Road eastward.

The sum of $93.60 was also spent in repairing damage by fire to that portion which lies between Otter Lake and Booth's Bridge.

Mississippi and Frontenac Junction Road.

Two and a half miles repaired from the intersection with the Frontenac Road northerly, and the whole road reported as in good condition.

Monck Road.

Repairs were made from Uphill eastward three and a half miles, and from Cheddar to Burnt River, seven miles.

Four miles were constructed as a deviation, and is from the Snowdon Road on the north side of Burnt River, beginning on lot 26, concession 5, Snowdon ; thence easterly along or near the river to Furnace Falls on lot 18, concession 1, crossing the river on a bridge previously built and now repaired and improved, and uniting with the original Monck Road, on lot 17 in the last named concession line of Snowdon.

This deviation was made for two chief reasons, one being to avoid a series of railway crossings which, from the nature of the country, were unavoidable and would have been a constant source of danger ; and the second was, that the settlement was upon the north side of Burnt River, and the road as it then existed was valueless to that section, while few if any were in any degree served by the original location.

This, on account of so much new work and necessary repairs to bridges, cost more than the appropriation by some $800.

Monmouth Road.

Work this season was commenced at lot number 10 between concessions 21 and 22 of Cardiff, and continued from thence easterly along or near the said concession line to Deer Lake Road, intersecting it on lot 24 in concession 21, a distance altogether of four and a half miles of new work, cut out only 25 feet wide, but fairly leveled and graded.

Monteagle Road.

This portion of the road, which is three miles long, had been chopped out as a winter road, but was unfit for general travel. It is from the boundary between Dungannon and Monteagle southerly to the Mississippi Road, and is an important highway in the interests of settlers and the further development of the townships.

North Algona (4th Con.) Road.

Two and a half miles of construction, and is on the third and fourth concession line, beginning at the boundary line between Wilberforce and North Algona and extending to Golden Lake.

North Bay and Temiscamingue Road.

Work was continued from last season's operations between concessions 2 and 3 of Widdifield northward between lots 14 and 15 to the fifth concession; thence east to the line between lots 13 and 14, thence northward to the town line of Merrick. After this the work was continued north-westerly into Merrick, through a rough and hilly district as far as the third concession, the last half mile being on the town line between Merrick and Mulock, giving six miles of road constructed and two miles of grading which last year had been chopped out only.

This district is being rapidly occupied, or at any rate as fast as the road construction.

North Bay and Trout Lake Road.

A road from the North Bay and Temiscamingue Road, easterly to Trout Lake, and about its north shore.

Three miles and a half of almost new work was made this year, as only about two miles of the route was a rough trail.

The road is through lots 21 and 22, of concession C. Widdifield, and through lots 19 to 16 of concession B; and again in concession C, through part of lot 16 and lot 15 to the lake shore.

It is desirable that the road be produced yet some distance in the interests of the farther development of that section which is yet so new.

Opeongo Road.

Of the grant of $1,200, the sum of about $700 was spent in improving a deviation made last year about the Prussian Hills, as then more fully described. This portion is reported as well repaired and very much improved over its length of six miles.

For the balance of the appropriation four miles between Brudenel and "Foy's Hotel" were repaired, making a total of ten miles of improvement.

Opinicon Lake Road.

This work is chiefly the formation of a high embankment over some low or drowned land of Lake Opinicon.

The bottom was first filled with timber to low water line and then further raised from two to four feet with stone, so as to raise it about two feet above the general high water line.

The length is 280 feet, and is between lot 1, concession 16, Bedford, and lot 16, concession 15, Storrington. Some other work was done as repairs on portions of the road.

Otter Creek Bridge.

The renewal of a bridge in Monmouth, on the Monmouth Road, built in 1886, and this season destroyed by fire. The estimated cost is $250, of which $100 had been paid when the accounts closed at the end of the year.

Palmer Rapids Bridge and Road.

The bridge in question—called in the estimates Madawaska River Bridge, is on the line of this road over the said river, and was built for a fixed sum, except some small work paid for as extra. It is built upon piers in connection with an existing dam, and was so done upon the recommendation of the Inspector as being cheap and sufficient for present purposes.

The road work consisted of seven miles of repairs or improvement of that which three years ago had been opened as a winter road, and lies between the Madawaska River and the town line between Carlow and Raglan. It will doubtless be of great convenience to settlers in the northern portion of the County of Hastings as well as to those in the adjoining county.

Paudash Lake Road.

This road, described generally in last year's report, was further improved this season and made passable for vehicles over its length of about eight miles.

In addition, two short branch roads were made to connect with settlements and lumber roads for the convenience of residents.

The work amounts to about eight miles of repairs and two miles of construction.

Peterson Road.

Ten miles of the main road were improved, namely: from the Hastings Road eight miles eastward and two miles westward. Peterson Branch Road, was also repaired from near Combermere six and a half miles towards Brudenel. Again, in the township of Herschel, upon application of the County Council of Hastings, and their grant of $100 towards the work, a bridge was built over McGeary's Creek, lot 10, concession 8, 300 feet long, and costing altogether about $200. The settlers had opened the road but were unable to build the bridge.

Peterson and Stanhope Branch Roads.

On these two roads fourteen and a half miles were well repaired.

Those on the Peterson Road proper were from Buskong Lake easterly two miles, and from the line between lots 30 and 31 of Stanhope easterly, three and a half miles.

On the Stanhope Branch Road, the work was from the Peterson Road (about one and a half miles west of Haliburton) southerly six miles; and again from the Peterson Road northerly, between lots 30 and 31 on [illegible] miles—a large amount of work for the expenditure $950.

Petewawa and Alice Road.

A road on the town line between Petewawa to Alice, from lot 7 to lot 13, both inclusive, one and three quarter miles of new work, all graded except a quarter of a mile which for want of money was not completed.

Petewawa 6 and 7 Side Line Road.

One mile and a half of repairs upon the above named side line of Petewawa, from the Pembroke and Mattawa Road westward.

Petewawa 15 and 16 Side Line Road.

It was intended to open this road through concessions 6 and 7, but the money given, $200, was only sufficient to build half a mile, leaving some 30 chains yet unfinished.

Perth Road.

Repairs were made over three sections of the road, the first of which was between Stone's Corners and Tett's Mill, twelve miles; the second from the mill just named to Westport, six miles; and the third section, from the last named point northward seven miles. Total length, twenty-five miles.

Point Alexander and Bass Lake Road.

Work was begun on this road two years ago, and continued last season as well as the present.

Two and three quarter miles were constructed in the two previous years, and one and a half miles this season, opening the road from Point Alexander, on the Pembroke and Mattawa Road, to Bass Lake Station, on the Canadian Pacific Railway. It is understood that the road is not yet thoroughly graded, while it is now a good winter road.

Raglan and Snake Creek Road.

This is a road four miles long which the settlers had chopped out twenty-five feet wide, and is an outlet for a large German settlement.

It begins at the main road on the south side of the Madawaska River, in Raglan township, at the north end of lot thirty-two, in concession fifteen, and is from thence southward through to concession ten inclusive, ending at the south-east angle of lot twenty-five, its course being almost direct. The grant was spent upon two and a half miles, which was graded and otherwise improved.

Rolph and Wylie Road.

A new road in the township of Rolph, begun on the boundary between Rolph and Wylie, between lots ten and eleven, and continued northward on the last named line to the fourth and fifth concession line. Two and a half miles, cut out forty feet wide, and partially graded.

Ross and Bromley Town Line Road.

There were three miles of this road opened roughly last year, from lot five to lot thirteen of Ross, one and a quarter of which, this season, was permanently completed. The lowness and wetness of the ground, is given as the reason for the comparatively short length wrought over.

Sebastopol and Lyndoch Road.

This is a new road of two and three quarter miles, commenced at the line between lots four and five, of concession fourteen, Lyndoch, and made from thence southward to lot nine, in the same concession, and then crossing the lots to number thirteen, in concession thirteen.

It is chopped out twenty-five feet wide and fairly graded, making a passable waggon road, and accommodating a large number of German settlers.

Scott Road.

The chief work was building a bridge one hundred and twenty-five feet long, having a main opening of twenty-six feet.

Sharbot Lake Bridge.

The floating bridge was repaired at a cost of a little over $100, and the balance of the expenditure used in building a new bridge on the road, about two miles south of the railway station.

Shaw Road.

Repairs from lot three, concession fifteen, Wilberforce, south to lot one, concession fourteen. One and a half miles of improvement.

Sherwood Road.

A new work of three and three-quarter miles, its position being as follows: Commencing at the boundary line between Hagarty and Sherwood, and from thence north to the sixth and seventh concession, from that between concessions five and six; thence westward, between concessions six and seven of Sherwood, to the road allowance between lots five and six, and from thence northward on the last named road allowance, to that between concessions eight and nine. It is chopped out thirty-five feet wide and fairly well grubbed and graded.

Snowdon 10 and 11 Side Line Road.

This is the completion of this side line road as given in last year's report, and is one and a quarter miles of repairs, including a bridge over Burnt River, one hundred feet long.

Sturgeon Falls Bridge and Road.

This bridge is one built from an island over a branch of Sturgeon River, and is the continuation of the road over the river where, last year, a one hundred and thirty feet span iron bridge was erected.

The present structure is a wooden one, one hundred and eighty feet in length, with two main spans of fifty feet in the clear, built in accordance with a plan furnished. The centre crib is sixteen feet high, and the end ones about thirteen feet each.

It was found necessary to spend nearly $500 more than the grant in order to make approaches to the bridge, that it and the iron bridge might be available for traffic.

Tamworth and Oso Road.

Repaired from about five miles south of Arden, southward, five miles, towards Tamworth. Fires in this instance had caused considerable damage, putting the road in very bad condition, but now said to be in good shape.

Victoria Road.

These repairs were f[illegible]m the Victoria Railway, southerly, about four and a half miles

Wilberforce and Alice Road.

A new road on the boundary between Wilberforce and Alice, from where the line between lots twenty-two and twenty-three, of concession twenty-five, intersects the same, westerly, two and three-quarter miles, embracing a lage amount of crosswaying.

Wilberforce 18th Concession Road.

This work is on the road allowance between concessions seventeen and eighteen, from lot twenty-one to lot twenty-five, both inclusive. It is an entirely new work, one and a quarter miles in length. The money was not sufficient to complete a long crossway over Black Creek, so that the whole road is as yet unfinished.

Wilberforce and Algona Road.

This is a continuation of last year's work, in opening the town line between Wilberforce and North Algona. Half a mile made.

Wilberforce 15 and 16 Side Line Road.

A mile and a quarter of swamp, which required to be raised and improved so as to make the road passable.

The foregoing completes the list, and I now beg to add the following summary of expenditure upon the same :—

SUMMARY OF EXPENDITURE UPON COLONIZATION ROADS AND BRIDGES IN 1887.

——	Cash.	Supplies from Department.	Total.
NORTH DIVISION.	$ c.	$ c.	$ c.
Barrie Island ..... Bridge	43 50	.....	43 50
Base Line ..... Road	396 80	.....	396 80
Basswood Lake ..... do	881 25	120 43	1001 68
Bright and Gladstone ..... do	529 21	.....	529 21
Clark's ..... Bridge	.....	74 31	74 31
Cockburn Island ..... Road	807 55	190 47	998 02
Coffin ..... do	700 00	141 95	841 95
Coyne's ..... do	907 53	119 86	1027 39
Grand Portage ..... do	500 70	.....	500 70
Great Northern ..... do	614 76	.....	614 76
Huronian Mines ..... do	7237 47	1219 08	8456 55
Inspection	1427 00	.....	1427 00
Manitoulin Island ..... Roads	4677 57	585 76	5263 33
Mississaga ..... do	1789 72	363 46	2153 18
Parkinson, balance of '86 ..... do	87 36	.....	87 36
Parkinson ..... do	811 64	189 68	1001 32
Point De Meuron, balance of '86 ..... Bridge	106 48	.....	106 48
Point De Meuron ..... Road	1511 50	154 44	1665 94
Rabbit Mountain and White Fish Lake, balance of '86 ..... do	50 11	.....	50 11
Rabbit Mountain and White Fish Lake ..... do	7116 04	393 30	7509 34
Rainy River ..... do	3115 21	848 83	3964 04
Rat Portage and Keewatin, balance of '86 ..... Bridge	89 63	.....	89 63
Rat Portage and Keewatin ..... Road	1027 85	.....	1027 85
Rock Lake Branch, on account ..... do	100 00	.....	100 00
Spanish River, on account ..... do	100 00	.....	100 00
St. Joseph Island ..... Roads	2206 67	446 91	2653 58
Thessalon Road ..... Bridge	397 50	.....	397 50
	37233 05	4848 48	42081 53
LESS GRANT FROM—			
Rabbit Mountain Mining Co	.....	.....	800 00
*Departmental Expenditure	.....	.....	41281 53
WEST DIVISION.			
Ah-mic Lake, on account ..... Bridge	600 00	113 18	713 18
Alsace ..... Road	710 25	99 40	809 65
Baxter ..... do	487 38	21 80	509 18
Baysville and Gravenhurst, '78-9 ..... do	50 00	.....	50 00
Black Creek ..... Bridge	70 00	.....	70 00
Black River, balance of '86 ..... do	18 00	.....	18 00
Booth's ..... do	342 36	41 47	383 83
Brennan's, on account ..... do	600 00	.....	600 00
Bridge Repairs, Parry Sound District	1261 00	95 34	1356 34
Brandy Lake Creek Works, balance of '86	40 08	.....	40 08
Brunel ..... Roads	503 51	.....	503 51
Burk's Falls ..... do	1060 89	85 43	1146 32
Burk's Falls Station ..... do	516 69	.....	516 69
Burpee ..... do	650 95	153 09	804 04
Carling ..... do	714 10	192 96	907 06
Cardwell Junction ..... do	525 45	.....	525 45
Carrington ..... do	549 12	.....	549 12
Christie ..... do	309 12	.....	309 12
Dee Bank and Three Mile Lake ..... do	645 40	.....	645 40
Distress River ..... do	197 94	.....	197 94
Draper and Gravenhurst ..... do	556 10	.....	556 10
Eagle Lake ..... do	137 00	.....	137 00
Ferguson ..... do	595 53	207 97	803 50
Golden Valley ..... do	756 26	120 15	876 41
Hagerman and Croft ..... do	309 19	.....	309 19

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

		Cash.	Supplies from Department.	Total.
WEST DIVISION—*Continued.*		$ c.	$ c.	$ c.
Himsworth, No. 1	Roads	693 76	118 45	812 21
do No. 2	do	913 29	53 29	966 58
Inspection		1,270 05		1,270 05
Joly	Road	829 84	166 21	996 05
Junction, No. 2	do	500 00		500 00
do No. 3	do	503 97		503 97
Kearney, No. 2	do	476 26	47 49	523 75
Lake Shore	do	507 41		507 41
Leg Lake, balance of 1886	do	13 02		13 02
Leg Lake	do	188 53	32 20	220 73
Macaulay	do	600 12		600 12
Maganetawan	do	716 76	132 43	849 19
Manitowaba	Bridge	468 63		468 63
Maple Island, balance of 1886	do	23 91		23 91
Mills and Wilson	Road	620 38	249 68	870 06
Monck Centre	do	994 36	5 68	1,000 04
Monck 5 and 6 Side Line, on account	do	100 00		100 00
Monteith and Perry, No. 1	do	757 48	130 17	887 65
do No. 2	do	489 71	34 94	524 65
Muskoka	Road Bridges	340 00		340 00
Muskoka	Road	1,334 85	304 47	1,639 32
Musquosh	do	514 96		514 96
New Jerusalem	do	710 95	78 60	789 55
Northern	do	473 76	74 31	548 07
North Ryerson	do	527 10		527 10
Nosbonsing	do	679 97	182 27	862 24
Orange Valley	do	600 30		600 30
Parry Sound	do	562 49	30 31	592 80
Peterson	do	265 03		265 03
Rosseau and Nipissing	do	100 20		100 20
Ryde	do	655 84	151 93	807 77
Ryde Centre	do	832 75		832 75
Seguin Falls	Bridge	220 93		220 93
Seguin River	do	177 50		177 50
Sinclair	Road	804 65		804 65
Stephenson Town Line	do	85 00		85 00
Stisted Swamp	do	229 80		229 80
Storage	do	7 00		7 00
Trout Creek	Bridge	689 31	291 06	980 37
Westphalia	Road	802 32	171 54	973 86
		33,488 51	3,385 82	36,874 33
LESS GRANT FROM—				
Muskoka Mill and Lumber Co	$ 66 50			
Municipality of Draper and Oakley	50 00			
Residents of Burk's Falls	100 00			216 50
Departmental Expenditure				36,657 83
EAST DIVISION.				
Addington	Road	1,047 50	34 50	1,082 00
Admaston	do	542 42		542 42
Algona and Hagarty	do	529 81		529 81
Algona (Telegraph)	do	502 90		502 90
Anstruther	do	432 51		432 51
Beachburg and Cobden	do	500 55		500 55
Bear Lake	do	200 00		200 00
Bobcaygeon, No. 1	do	559 63	234 78	794 41
Bobcaygeon, No. 2	do	469 23		469 23
Bonnechere River	do	508 13		508 13
Bromley 9 and 10 Side Line	do	400 00		400 00
Buckhorn, No. 1	do	400 00		400 00

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

	Cash.	Supplies from Department.	Total.
EAST DIVISION—*Continued.*	$ c.	$ c.	$ c.
Buckhorn, No. 2 ..... Road	768 22	.....	768 22
Buckhorn, No. 3 ..... do	189 50	.....	189 50
Burleigh ..... do	882 68	.....	882 68
Burnt River, on account ..... Bridge	200 00	.....	200 00
Callender Station ..... Road	517 90	.....	517 90
Cavendish ..... do	396 82	.....	396 82
Chalk River ..... do	303 60	.....	303 60
Chandos ..... do	317 78	.....	317 78
Chandos and Wollaston Town Line ..... do	214 50	.....	214 50
Cobden and Eganville ..... do	200 00	.....	200 00
Combermere ..... Bridge	157 94	.....	157 94
District Line and Douglas ..... Road	606 25	.....	606 25
Dungannon ..... do	184 38	22 70	207 08
East Stanhope ..... do	636 56	169 46	806 02
Eganville and Foy ..... do	539 40	.....	539 40
Golden Lake ..... Bridge	110 00	.....	110 00
Gooderham ..... Road	200 00	.....	200 00
Grattan and Clontarf, balance of 1886 ..... do	26 50	.....	26 50
Hagarty and Brudenel, balance of 1886 ..... do	164 72	.....	164 72
Haley's Station ..... do	200 88	.....	200 88
Harvey ..... do	499 50	.....	499 50
Hastings ..... do	950 53	85 14	1,035 67
Herschel Town Line ..... do	454 68	56 75	511 43
Hinchinbrooke ..... do	199 27	.....	199 27
Indian River ..... do	500 51	.....	500 51
Indian River ..... Bridge	155 97	.....	155 97
Inspection	1,086 42	.....	1,086 42
Lapasse and Beachburg ..... Road	500 63	.....	500 63
Lavant Branch ..... do	535 25	.....	535 25
Lutterworth ..... do	45 00	.....	45 00
Lutterworth and Somerville ..... do	50 00	.....	50 00
Mattawa and Temiscamingue ..... do	1,499 61	.....	1,499 61
McClintock ..... do	700 00	97 25	797 25
McCool, balance of 1886 ..... do	135 68	.....	135 68
Mississippi, No. 1 ..... do	759 54	.....	759 54
Mississippi, No. 2 ..... do	335 00	.....	335 00
Mississippi, No. 3 ..... do	93 60	.....	93 60
Mississippi and Frontenac Junction ..... do	519 62	.....	519 62
Monck ..... do	2,475 46	337 49	2,812 95
Monmouth, on account ..... do	450 00	.....	450 00
Monteagle ..... do	262 43	34 10	296 53
Mud Creek, balance of 1886 ..... do	50 00	.....	50 00
North Algona, 4th Concession ..... do	500 00	.....	500 00
North Bay and Temiscamingue ..... do	2,521 39	483 46	3,004 85
North Bay and Trout Creek ..... do	404 73	.....	404 73
Opeongo ..... do	1,260 67	.....	1,260 67
Opeongo and Rockingham, account 1886 ..... do	250 00	.....	250 00
Opinicon ..... do	509 20	.....	509 20
Otter Creek, on account ..... Bridge	100 00	.....	100 00
Palmer Rapids ..... do	387 24	.....	387 24
Palmer Rapids ..... Road	450 00	.....	450 00
Pandash Lake ..... do	597 78	.....	597 78
Peterson ..... do	1,521 96	178 22	1,700 18
Peterson and Stanhope Branch ..... do	950 00	.....	950 00
Petewawa and Alice ..... do	499 98	.....	499 98
Petewawa, 6th and 7th Side Line ..... do	100 00	.....	100 00
Petewawa, 15th and 16th Side Line ..... do	199 90	.....	199 90
Perth ..... do	1,002 73	.....	1,002 73
Point Alexander and Bass Lake ..... do	501 88	.....	501 88
Raglan and Snake Creek ..... do	396 35	.....	396 35
Roche Fondeau, balance of 1886 ..... do	46 21	.....	46 21
Rolph and Wylie ..... do	507 75	.....	507 75
Ross and Bromley ..... do	500 10	.....	500 10
Sebastopol and Lyndoch ..... do	418 54	.....	418 54

SUMMARY OF EXPENDITURE, ETC.—*Continued.*

——	Cash.	Supplies from Department.	Total.
EAST DIVISION—*Continued.*	$ c.	$ c.	$ c.
Sharbot Lake.....Bridge	308 30	.....	308 30
Scott ..... do	426 30	.....	426 30
Shaw .....Road	200 00	.....	200 00
Sherwood ..... do	751 41	.....	751 41
Snowdon, 10 and 11 Side Line..... do	338 06	.....	338 06
Sturgeon Falls.....Bridge and do	1,201 94	48 23	1,250 17
Tamworth and Oso ..... do	400 49	.....	400 49
Victoria..... do	200 00	.....	200 00
Willberforce and Alice..... do	494 40	.....	494 40
Willberforce 18th Concession..... do	499 66	.....	499 66
Willberforce and Algona ..... do	250 45	.....	250 45
Wilberforce 15th and 16th Side Line..... do	104 70	.....	104 70
	43,971 12	1,782 08	45,753 20
LESS MUNICIPAL AND OTHER GRANTS—			
Refund Trout Lake and Folger Road of 1886.....$ 17 78			
Municipality of Smith..... 250 00			
County of Hastings 150 00			
County of Peterboro'..... 300 00	.....	.....	717 78
Departmental Expenditure	.....	.....	45,035 42

RECAPITULATION.

——	$ c.	Less' Municipal and other Grants.	$ c.	$ c.
I. North Division.....	42,081 53	800 00	41,281 53	
II. West Division.....	36,874 33	216 50	36,657 83	
III. East Division	45,753 20	717 78	45,035 42	
Total Departmental Expenditure.....	.....	.....	.....	122,974 78

HENRY SMITH.
Supt. Col. Roads.

DEPARTMENT OF CROWN LANDS,
31st December, 1887.

EIGHTEENTH ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF

ONTARIO.

1887.

Printed by Order of the Legislative Assembly.

Toronto:
PRINTED BY WARWICK & SONS, 26 AND 28 FRONT STREET WEST.
1888.

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EIGHTEENTH ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF

ONTARIO.

To the Honourable the Commissioner of Agriculture :

Sir,—In accordance with the provisions of our Statute of Incorporation, I beg to submit herewith the Annual Report of the Entomological Society of Ontario for the year 1887.

The Report contains a record of the proceedings of our annual meeting for the election of officers and the transaction of the general business of the Society, which was held in the City of Ottawa, on the 26th and 27th of October, 1887 ; it includes also the audited Financial Statement of the Secretary-Treasurer, the Reports of our Council and Montreal branch, the President's Annual Address, and the various papers read by members at the meeting.

I have also the honour to submit herewith several illustrated papers by our members on injurious, beneficial and other insects, which have been specially prepared for the information of the general public, and particularly for the assistance of the farmers and fruit-growers in dealing with their insect friends or foes.

Our monthly magazine, the *Canadian Entomologist*, has been regularly and punctually issued during the past year. Its nineteenth volume is now almost completed. It continues to be received with marked favour by scientific entomologists both in Europe and America, and it includes amongst its contributors and correspondents the most eminent specialists in this department of natural science both in the United States and our own country.

It is a matter of thankfulness that during the past year our Province has enjoyed great immunity from serious damages by insects ; those that have been particularly troublesome are referred to by our President in his address, or described in the papers that follow.

I have the honour to be, Sir,

Your obedient servant,

W. E. SAUNDERS,

Secretary-Treasurer.

ANNUAL MEETING OF THE SOCIETY.

The annual meeting of the Society was held pursuant to notice at Ottawa, on Wednesday and Thursday, 26th and 27th October, 1887. The meeting was held in Ottawa at the request of several members, in order that an opportunity might be afforded to visit the Central Experimental Farm of the Dominion Government, to examine the valuable collections of insects in the Museum of the Geological and Natural History Survey of Canada, and to inspect the collections of the members resident in Ottawa. Through the kindness of the civic rulers, the meetings were held in the City Hall.

A Council meeting was held on Wednesday, at 10 a.m., on the adjournment of which the Museum was visited and the insect collections examined, the magnificent exhibit of Lepidoptera eliciting universal admiration.

In the afternoon the Experimental Farm was visited, the Director, Prof. Saunders, kindly placing carriages at the disposal of the Council. A Council meeting was held in his office, after which he escorted the visitors around the farm, and explained the work already accomplished, and the plans for future operations. The house and barns in course of construction were justly admired, and it was evident to all that a great and useful work was being accomplished under the oversight of the director and his skilful assistants.

In the evening a general meeting of the Society was held in the council chamber of the City Hall, and the annual address was delivered by the President, Mr. James Fletcher. Among the large audience present were, in addition to members of the Entomological Society, many officers and members of the Ottawa Field Naturalists' Club, of the Ottawa Literary and Scientific Society, of the Geological Museum, of various educational institutions, agricultural associations, etc., as well as gardeners and farmers from the surrounding country.

The address was a very instructive and practical one, and was listened to with great attention and interest by all present. It gave a sketch of the growth of the Society, and an outline of the work being done and to be carried on at the Government Experimental Farms. The value of Natural Sciences as a training for the mental faculties and the co-relationship of the different branches was shown. The latter portion consisted of a report on the insect injuries for the year and the broad general principles regulating the application of remedies. On its conclusion a vote of thanks to the President was moved by Rev. C. J. S. Bethune, who described the work being accomplished in England by Miss Ormerod, and illustrated it by an account of her exertions to ward off the attack of the Hessian fly. The vote of thanks was seconded by Prof. Saunders, who confirmed the statements made in the address, and gave accounts of some experiments with solutions of Paris green as a preventive of curculio in plums, and codling moth in apples.

A collection of Coleoptera captured in the vicinity of Ottawa, was exhibited by Mr. W. Hague Harrington. It was arranged in eighteen cases and contained about 1,250 species.

The meeting for the election of officers, etc., was held at 11 a.m. on Thursday, in a committee room of the City Hall.

The President, Mr. James Fletcher, occupied the chair, and the following members of the Council were among those present:—Rev. C. J. S. Bethune, Port Hope; Mr. J. Alston Moffat, Hamilton; Mr. J. M. Denton, London; and Mr. W. H. Harrington, Ottawa.

The minutes of the previous meeting having been printed and circulated amongst the members, their reading was dispensed with, and they were duly confirmed.

Mr. W. H. Harrington was requested to act as Secretary in the absence of that officer.

Letters were received from Rev. T. W. Fyles, Quebec; Mr. E. Baynes Reed, London; Mr. H. H. Lyman, Montreal; Mr. W. E. Saunders, London; Mr. J. D. Evans, Trenton;

Capt. Gamble Geddes, Toronto, and others, announcing their regret at being unable to be present.

The Report of the Council was read by Rev. C. J. S. Bethune, and on motion of Mr. Denton, seconded by Mr. Moffat, it was duly adopted.

The statement of the Secretary-Treasurer (balance sheet) was received and adopted.

The Reports of the Montreal branch, and of the Delegate to the Royal Society of Canada, were received and referred for publication.

REPORT OF THE COUNCIL.

In presenting their Annual Report, the Council feel highly gratified in announcing the continued success that has attended the work of the Society during the past year.

The *Canadian Entomologist* has been published with regularity, and its pages have been filled as usual with valuable papers, contributed by leading entomologists in Canada the United States and Europe.

The Annual Report to the Legislature of Ontario was duly issued after some delay, and the Council feel justified in stating that it was in no way inferior to its predecessors in the diversity and character of its articles on practical Entomology.

Some valuable additions have been made to the Library by purchase as well as by donation. Among the latter may be especially mentioned the gift of a copy of Westwood's Oriental Entomology, by Miss Ormerod, of St. Alban's, England.

The Society's collection of insects, which was sent last year to the Indian and Colonial Exhibition in London, England, has been brought back and restored to the Society's rooms. The Council regret to state that two of the cases were broken in transit, and a number of specimens of lepidoptera were damaged. They trust, however, that the kindness of members will speedily replace those that are wanting.

The audited statement of the finances of the Society is submitted herewith, and shows a credit balance of $83.

The Council have very great pleasure in offering their hearty congratulations to their President, Mr. James Fletcher, upon his appointment to the important position of Dominion Entomologist and Botanist to the Central Experimental Farm at Ottawa. They cannot but feel that the Society has been much honoured by the selection of two of its presidents (Prof. Saunders and Mr. Fletcher) for high and important positions in the Dominion Experimental Farms, and they regard it as a welcome recognition of the usefulness and good work of the Society.

Since the last annual meeting, the Council have unanimously elected Miss Eleanor A. Ormerod, Consulting Entomologist to the Royal Agricultural Society of England, an Honorary Member, as a slight mark of the high estimation in which her labours in the field of practical entomology are held both here and elsewhere.

They have to deplore the loss they have recently sustained by the lamented death of their colleague, Mr. G. J. Bowles, of Montreal, who was for many years an active and zealous member of the Society, an able and efficient worker, and a valued contributor to the magazine and annual reports.

The annual meeting is this year summoned to be held in the City of Ottawa, at the request of several members, in order that an opportunity may be afforded of visiting the Central Experimental Farm, and inspecting the collections of insects at the Geological Museum and in the possession of resident members of the Society.

Presented on behalf of the Council.

E. BAYNES REED,
Secretary-Treasurer.

STATEMENT OF THE SECRETARY-TREASURER FOR THE YEAR ENDING OCTOBER 24TH, 1887.

Receipts.

Balance from previous year	$100 57
Members' fees, sale of *Entomologist*, etc	144 95
Provincial grant, 1887	1,000 00
Collectors' material—cork, pins, etc	59 74
Interest on Savings' Bank account	7 18
	$1,312 44

Disbursements.

Canadian Entomologist, printing, paper, stationery, etc	$591 77
Library account	110 23
Expenses of Report for 1886	133 10
Engraving	166 22
Annual grant to Editor	100 00
Rent	80 00
Insurance	25 00
Sundries—postage, telegraph, etc	22 39
Balance in hand	83 73
	$1,312 44

We certify that we have examined the above account, with books and vouchers, and found the same to be correct. Balance in hand and in bank, eighty-three dollars and seventy-three cents.

H. P. BOCK,
W. E. SAUNDERS, } Auditors.

London, Ont., October 24th, 1887.

MEETING OF THE MONTREAL BRANCH.

The fourteenth annual meeting of the Montreal Branch of the Entomological Society of Ontario, was held on May 31st, 1887, when the following officers were elected for the ensuing year:—President, G. J. Bowles; Vice-President, H. H. Lyman; Secretary-Treasurer, F. B. Caulfield; Council, W. H. Smith, J. G. Jack, J. F. Hausen and R. C. Holden.

The reports of the Council and Secretary-Treasurer were read, and on motion, adopted.

Mr. Bowles showed a box of Lepidoptera collected at Sudbury, by Mr. J. D. Evans, several of which were new to the members.

Mr. Lyman read a list of Hymenoptera and Diptera, taken at Hudson's Bay, by Dr. Robert Bell.

Mr. Caulfield read the following report of the Council for the past year:—

In presenting their fourteenth annual report, your Council regrets that owing to unfortunate circumstances, it is not so satisfactory as in former years.

The Society has sustained, since our last annual meeting, a great loss in the lamented death of Mr. Wm. Shaw, a member who enjoyed the highest esteem of his fellow entomologists as a man, and whose talents and energy warranted the expectation of a brilliant career as a naturalist.

During the past year, the absence of several of our most active members from the city, has resulted in but little collecting being done. Mr. Caulfield, however, has success-

fully worked out the life history of *Physonota unipuncta*, and his papers on this subject in the *Entomologist* are both interesting and important.

Only three meetings have been held during the winter, owing to the business engagements of some members and the serious illness of the President, who has been confined to the house for nearly a year. The following papers were read at these meetings :—

1. List of Noctuidæ, not previously recorded, from Montreal.—G. J. Bowles.
2. Notes on some species of Ips.—F. B. Caulfield.
3. Additions to list of Montreal lepidoptera.—G. J. Bowles.
4. Some further notes on Physonota.—F. B. Caulfield.

Your Council would suggest that efforts be made to increase the roll of membership, and urge upon all the need of increased zeal in the pursuit of our favourite science.

The whole is respectfully submitted.

GEO. JNO. BOWLES,
President.

F. B. CAULFIELD,
Secretary.

Montreal, 31st May, 1887.

REPORT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

The progress of the Entomological Society has been so uniform and constant during recent years, that it affords material sufficient for only a very brief report.

A great loss has been sustained by the Society in the removal of Prof. Saunders from London to Ottawa, and his consequent inability to longer undertake the onerous duties of President and Editor, which for many years he performed so faithfully and successfully. In his position of Director of the Experimental Farm he will, however, still be able to pursue his researches, and, with the necessary assistance of a competent entomologist, will be able to greatly advance the knowledge of the very important science of Entomology.

The publication of the *Canadian Entomologist* is successfully continued ; volume 18 contains papers from forty-nine contributors, all well-known workers, and many of the articles are of much scientific value. Volume 19 is now being issued under the editorship of Rev. C. J. S. Bethune, who edited the first five volumes, and who has been continuously a member of the editing committee, so that he is eminently qualified to take up the work laid down by Prof. Saunders.

The Sixteenth Annual Report contained as usual much matter of economic importance, and No. 17 is now ready for distribution.

The Annual Meeting of the Society was held in the Society's rooms, London, Ontario, on Wednesday, 20th October, 1886, when there was a very satisfactory atendance of members. The retiring President, Prof. Saunders, delivered a very interesting and instructive address, and several reports and valuable papers were presented.

The following resolution was carried unanimously by the meeting :—

"That the Society learns with regret that their esteemed friend, Prof. Saunders, has found it necessary to withdraw from the presidency of their body, and also from the editorship of their organ, *The Canadian Entomologist*, but recognizing the importance of the work Prof. Saunders has been called to superintend, and the wisdom of the choice made in him by the Government, it congratulates the Professor upon this recognition

of his abilities and zeal in the public service, and respectfully tenders to him a life membership in the Society."

Officers for the current year were elected as follows:—

President ..... James Fletcher, Ottawa, Ont.
Vice-President ..... Rev. C. J. S. Bethune, Port Hope, Ont.
Secretary-Treasurer ..... E. Baynes Reed, London, Ont.
Council ..... W. H. Harrington, Ottawa, Ont.; Rev. T. W. Fyles, Quebec, Que.; J. Alston Moffatt, Hamilton, Ont.; G. J. Bowles, Montreal, Que.; J. M. Denton, London, Ont.

W. HAGUE HARRINGTON,
Delegate.

May, 1887.

THE PRESIDENT'S INAUGURAL ADDRESS.

Ladies and Gentlemen,—Through the courtesy of the mayor and corporation of the city we are enabled this evening to make use of this commodious chamber.* The committee room put at our disposal for the other meetings would have been entirely inadequate to accommodate the large audience which I have the great gratification of now seeing before me. This pleasure, too, is considerably heightened, as I notice amongst you many of the class which our Society particularly strives to reach—to wit, farmers and gardeners—men who are daily brought face to face with the foes or friends, of which our members make it their special study to investigate the habits.

As there are many here this evening who are not members of the Entomological Society of Ontario, it is fitting that I should state briefly the nature and objects of that Society. Previous to 1863 there was no such society in Canada; but in that year a few naturalists, living in different parts of the Provinces, met together in Toronto and organized under the name of the Entomological Society of Canada. The membership at first was only sixteen, and this number included all those then known to be interested in insect life in Canada. From this small beginning the Society has steadily increased until its membership now reaches upwards of 500, and includes all the active workers in North America. The work done in the early years of the Society, notwithstanding the fact that the members were widely separated, was such that it soon became manifest that they must have some means of publishing the results of their observations for the benefit of each other and the scientific world in general. Accordingly in August, 1868, appeared the first number of the *Canadian Entomologist*, a monthly periodical, which from that time forward has been regularly published, and was for some years the only publication on the continent of America devoted solely to this important branch of natural history. It has now nearly completed its nineteenth volume. From the outset a noticeable characteristic of this magazine has been, that its pages have been entirely filled with the records of original work, and during its existence it has been the means of disseminating a vast amount of scientific knowledge, which has been of benefit not only to Canada but to the world at large. This organ of the Society is more particularly the scientific record of work done by the members, although it also contains many illustrated elementary and popular papers for the benefit of beginners. In addition to this, however, and what is an important part of our work, a popular report of some 75 or 100 pages is prepared annually upon injurious and beneficial insects, and the best measures for farmers and gardeners to adopt with regard to them. This is published every year as part of the report of the Minister of Agriculture and Arts for the Province of Ontario. Seventeen of these have already been issued, and have given to the farming community a large amount of useful information. Our Provincial Government recognizing the good work which was being

*The President's address was delivered in the council chamber of the Ottawa City Hall, on the evening of October 26th.

done by this Society, incorporated it in 1870, as the Entomological Society of Ontario, and gave at the same time material aid by allowing an annual grant from the public funds. By this assistance, the usefulness of the Society has been greatly widened, and the officers have become an advisory board to whom reference can be made whenever information concerning injurious insects is sought by farmers or others—an advantage of which the intelligent agriculturists of the Province have not been slow to avail themselves.

Of all the important events affecting agriculture in Canada which have happened during the past year, none can compare for importance with the establishment of the system of Experimental Farms throughout the Dominion, lately organized by the Federal Government. To no one more than to our members can it be a source of so great pleasure, that the person chosen for the important and responsible position of Director, should have been the present incumbent, Prof. William Saunders, who has been for so many years identified with the prosperity and progress of our Society; what he has been to us we all know; what others consider his value to have been, is well shown by Prof. A. R. Grote, one of the best American entomologists and a highly esteemed and regular contributor to the *Canadian Entomologist*.

When speaking of that journal in the preface to one of his works, he says :—

"The treatise of Dr. Harris which has become classical on its subject, did much towards creating a general interest in entomology; but the publication of the *Canadian Entomologist*, a journal aided pecuniarily by the Ontario Government, and owing its success chiefly to the unselfish labours of Mr. William Saunders, has assisted the progress of entomology in America probably more than any one other similar undertaking." This statement is not a bit overdrawn. Prof. Saunders—and I speak of him from an intimate acquaintance extending over a space of many years—is an exceptional man, remarkable not less for the diversity than for the thoroughness of his accomplishments, but above all for his tact and good judgment which have made him an object of respect and have endeared him to all who have had intercourse with him. Now, above all things, Prof. Saunders is an entomologist, and to it chiefly he owes his eminence. We congratulate him upon his appointment and also the Honourable Minister of Agriculture upon the wisdom of the choice he has made.

It may not be amiss here to say a few words with regard to the work it is proposed to carry out at these Government experimental stations. In the first place, the system will consist of a Central Experimental Farm at Ottawa and four other branch farms divided as follows : one for Ontario and Quebec, one for the Maritime Provinces, one for British Columbia, and one each for Manitoba and the North-West Territories. The officers at the Central Farm will be, the Director, and an Entomologist and Botanist combined, a Chemist, a Horticulturist and an Agriculturist. At the Central Station there will be a museum for the preservation of objects of interest. These, of course, will include all the different kinds of grain and other crops, and as well, cabinets for entomological and botanical specimens. As most of you are aware, I have been appointed to fill the position of Entomologist and Botanist to the Dominion Experimental Farms. I trust that I may be able to show before long that this selection was not ill advised. At any rate, I can assure you that no efforts will be wanting on my part to render the office one of general utility and a benefit to the farming community. I purpose, as quickly as possible after the building is finished, to place in the museum a collection showing, under each of the principal crops, all the insects by which it is attacked, so that the farmer or gardener who finds any of his crops injured by insects can come to the museum and see for himself, under the head of each plant the injurious insects known to infest it, and at the same time learn the most approved methods of treating them.

In addition to the above, there will be a botanical garden on the farm, a plot of about 65 acres having been appropriated for this purpose. Here native plants of economic value, as our forest trees, will be grown in large numbers for distribution and observation under varying conditions, so as to note their behaviour under different circumstances. Here, also, will be cultivated a large collection of plants of interest to the botanist from all parts of the world, including, of course, all the native species, of which I can obtain roots or seeds. It is thus hoped that many of the difficult problems will be cleared up which at present trouble the

scientific botanist, who has, perhaps, had to work at some of the least known or rare species with scanty and imperfect dried material. In this botanical garden and arboretum there is a remarkable diversity of habitat, from open water and an area of sphagnous bog to sandy upland with all the intervening varieties of soil—rock, shady ravine, heavy clay, light loam, sand, etc.—and I feel confident that a large proportion of our Canadian wild plants can be grown and examined at leisure. It will be noticed that the two posts of entomologist and botanist have been united. I consider this was a very wise arrangement, at any rate until the work in connection with these two posts increases so much as to make the appointment of two officers necessary. One of the most important things the entomologist will have to attend to will be the injuries to plants from insects. It sometimes happens, however, that it is difficult to tell at first the source of an injury to vegetation. The attacks of some of the low forms of vegetable life and of insects being, in their effects, very similar, so much so that instances sometimes occur when even careful observers, unless specially informed, may make mistakes. Again, sometimes injuries due to other causes altogether are attributed to either insects or fungi. During the past summer, there was great consternation in the county of Prince Edward on account of a serious failure in the pea crop, the complaint being that no seeds were formed. In this county peas are largely cultivated, on some farms to the exclusion of all other crops, and the seed produced is of such high quality that the best dealers in the United States and in England find it advantageous to procure their seed from this district. Many suggestions were made to account for this failure which was of such importance to a large proportion of the community, and insects and parasitic fungi were at once accused. It seems probable, however, that the excessive drought which prevailed during the whole summer was the sole cause. It is true that mycelium of fungus was found upon the roots in some instances, but this was always where the plant had been killed and was dead at the collar, the fungus only accompanying the decay of the roots and their tubers. These tubers on the roots of the leguminosæ are very interesting. Through the kindness of Prof. W. G. Farlow, of Harvard University, I have had my attention drawn to an excellent article by A. Tschirch, entitled "A Contribution to the Knowledge of the Root Tubers of the Leguminosæ." It is published in the Transactions of the German Botanical Society of 2nd February, 1887. This, for the first time, explains the use of these bodies, the nature of which had for many years been misunderstood. It would appear that all leguminosæ bear some kind of tubers on their roots. These vary in shape in the different genera; but they all have the same use, namely, to act as reservoirs where, during the time of active growth, nitrogenous materials are stored up until required to supply the large amount necessary to fill the seeds. These latter then draw off from the tubers the nitrogenous materials, leaving them empty. Now, on the plants in Prince Edward county which I had an opportunity of examining on several farms, through the courtesy of J. M. Platt, Esq., M.P., of Picton, the plants presented the characters of having (*i.*) a living stem above, (*ii.*) a vigorous tuber-bearing root, upon which, however, some of the tubers were in a state of decay, and (*iii.*) a short piece of dead stem at the surface of the ground effectually separating these two portions. I feel now pretty well assured that this state of affairs was brought about much in the following manner: Just about the time the peas were coming into flower, a period of drought set in which caused the stems to fade and lie over at a time when there was not sufficient foliage to protect them, in this way their bases were exposed to the direct heat of the sun as well as that from the hot, parched earth, and they were thus injured to such an extent that they could no longer act as channels for the interchange of materials from the root to the stem and *vice versa*. If this be the correct view, the exceptional drought of last year must be assigned as the cause for this shortage, and not any attack which is likely to give trouble in the future. One noticeable feature about the plants examined was the abundance and large size of the root tubers, and this might have been anticipated had their nature at the time been understood. It points to the fact, however, that although this year the crop in Prince Edward county is small it is from an exceptional cause, and there is every reason to believe that with an ordinary season this district, so justly celebrated, will still show that it is without an equal in Ontario as a pea-producing county.

There are other injuries the nature of which is not apt to be understood. Amongst these I would specially mention the "club root" in the cabbage, which is produced by a

fungus (*Plasmodiophora brassicæ, Wor.*), although by many it is thought that it is caused by the attacks of a small beetle. Another injury caused by a fungus, but which has very much the appearance of an injury by insects is the Plum-leaf Fungus (*Septoria cerasina*, Pk.) which has the effect of making small holes in the leaves of plum trees as if they had been perforated by shots from a gun. This has been sent to me during the past summer for information as to the "insect" which was supposed to be the depredator. Again, the curious disease called "bumble-foot," to which some breeds of poultry are liable, is occasionally supposed to be due to the attacks of insects. It is probable, however, that the large swellings on the feet of chickens so named are really abscesses, due to aggravated bruises caused by high perches and a hard floor to the poultry house.

These few instances, however, are sufficient to illustrate the advantage of any investigator being familiar with at any rate the first principles of other branches of study besides his own specialty, for he will frequently be applied to for information, and, indeed, will require for his own work knowledge of allied subjects.

Perhaps one of the greatest surprises to one who begins to devote a portion of his time to the study of Natural History, is the discovery, which soon forces itself upon him, that instead of there being a large number of different sciences, these are merely several branches, all of which are so intimately related, nay, even dependent upon each other, that they are merely component parts of one great whole. Nor does any one branch very much surpass the others in importance, for each one is necessary to the rest. And the special value of any one study over the others is only in the eyes of those students who devote to it their particular attention. All are links in one great chain of knowledge, engrossing to the highest degree to all who are happy and lucky enough to feel its charms, and of enormous importance to the world at large.

In a consideration of this theme we can begin at any one of the links, and, perhaps, to-day it is more fitting to begin at our own special subject—Entomology. Most nearly related to Entomology is Botany, the branch of science which treats of the vegetable kingdom from which so large a proportion of the insect world derives its sustenance. An intimate knowledge of the different species and families of plants is of great importance to the Entomologist. It frequently occurs that in his studies he requires to breed through all its stages some insect which feeds naturally upon a plant not to be obtained in his neighborhood; with a knowledge of the different orders and classes of plants he is able to make use of a nearly related species, sometimes even of a different, but closely allied genus. There are many instances on record where this has been done; but by far a larger number where, for want of this knowledge, valuable insects have been starved from only having improper food offered them. The economic entomologist is much helped in his investigations by this knowledge. Many of the injurious insects which attack our cultivated crops, especially those of which there are two or three annual broods, subsist during one or more of these on wild plants allied to those cultivated. By a removal of the wild plants many of these pests are naturally kept very much in check, for it must never be lost sight of that the great factor which influences the amount of insect-presence is the amount of food-supply. Then the important offices performed by insects in their relations with plants render them objects of very great interest to the botanist; he recognizes in them nature's pruners, which remove or prevent a too great exuberance of growth; and they perform such a conspicuous part in the fertilization of the seeds as to have been designated "the marriage priests of plants," ushering the young seedling into existence; they also remove it from the face of nature directly its usefulness and beauty are gone, so that its place may be taken by others. The fact that insects and seeds form the greater part of the food of so many birds, naturally connects the studies of the ornithologist with the two preceding. By the dissection and examination of the stomachs of birds, many useful assistants of the farmer and fruit grower have regained a good character of which ignorance had robbed them. How many thousand of woodpeckers and owls and hawks, which were nobly doing man's works for him, have fallen victims to this spirit of ignorance.

These remarks will apply equally to several other branches of Zoology.

The next step is to the laboratory of the chemist. Here the entomologist finds the materials for alluring and preserving the specimens for his cabinet, or is provided with

means to wage war against those which increase in such undue numbers as to require to be treated as enemies. The botanist, too, must come to the chemist to discover the exact nature of soils and the different fertilizers, as well as the principles contained in the plants which he collects or cultivates, so as to know the comparative values of each species in a family of plants. Chemistry teaches us not only how, by special treatment, virulent poisons may be transformed into nutritious foods, as in the case of arrowroot and other products derived from the Araceæ, but also how some species in the same genus may be harmless and others noxious. This we find amongst the Sumachs—where we have the Stag's-horn Sumach (*Rhus typhina*), the seed coats of which provide the French Canadian with wholesome vinegar and a refreshing summer beverage, and also its near relative the Poison Ivy (*Rhus Toxicodendron*). Conversely, too, the obligations of the chemist are just as great for the exact information as to species, growth and habits of plants which he receives. The close relationship existing between chemistry and mineralogy is manifest, as is that of the latter with geology. In the last named science the Palæontologist finds frequently the necessity of a thorough knowledge of the different branches of Zoology and Botany, so that he may correctly identify the fossil remains brought before him, and refer the rocks bearing them to their proper ages.

By common consent the students in some of these branches work together with mutual benefit. The botanist delving in the earth in search of roots, or gathering mosses from the woods and swamps, finds many minute insects and shells. The conchologist, wading in the shallow waters or raising up the bark of dead trees when looking for shells, frequently discovers aquatic plants and insects of rarity. The entomologist, peering and prying everywhere to discover the active objects of his quest, is not less useful to the others, and so we find that each branch of science is an aid to the others, and must be developed to the highest degree, not only that as much knowledge as possible may be accumulated in its own domain, but also from the collateral value it may be to other sciences.

But I need not remind you the value and interest in the natural sciences is not for its devotees alone. It is not too much to say that the almost phenomenal strides which have been made in the progress of the world during the past century are due entirely to the developments of scientific knowledge. I will, however, refer briefly to one special line of progress in which this kind of study has been found of great use.

Educationalists in all parts of the world attest the value of the Natural Sciences as a part of the practical education of youth; and the fact that they enter so largely into the curriculum of our Ontario schools does much towards showing the high state of excellence of the methods here adopted towards preparing our young men and women for fighting the battle of life.

These studies, it must be remembered,—used educationally—are essentially not *ends*, but *means*; means for producing in the mind exact and careful methods of thought, of developing the faculties of accurate observation, and above all things are important as giving a power to express in a concise and definite manner what it is wished to relate. If these characters be not found in the Naturalist much of his work is but play, and his labour is lost; his studies are useless to himself and of little value to anyone else.

I cannot help thinking that the scientific outlook in Canada is far brighter at the present time than it has ever been before. The facilities of communication and travel which now exist put us at an enormous advantage over our predecessors. The result of these increased facilities has been, as a matter of course, a great spread of all kinds of knowledge, and entomology is perhaps one of the most benefited.

In all directions we hear of a higher appreciation amongst farmers and others of the value of this study. Addresses from specialists concerning insect life are asked for to be delivered at Teachers' Institutes, before our Normal Schools, at meetings of Farmers' Institutes and similar associations. Quite recently the Legislature of British Columbia has seen the advisability of appointing a Provincial Entomologist, and it is with pleasure that we learn the appointment has been given to one of our members, the Rev. G. W. Taylor, an excellent Naturalist and one who cannot but do good. Lectures explaining and popularizing Entomology are found to be always acceptable before Natural History Societies in all parts of the country, and in *The Educational Review*, a monthly magazine

published in St. John, N.B., a most excellent series of illustrated popular articles is appearing from the pen of Principal A. H. McKay, of Pictou, N.S. These are in the shape of addresses to an imaginary class at "Ferndale School," and from their simplicity and accuracy will certainly be intelligible to all and give much instruction.

From this it will be seen that anyone now-a-days who wishes to obtain knowledge concerning injurious and beneficial insects can do so with very little trouble.

The ease with which parcels of specimens and books may now be sent by mail and the low rates of postage, as well as the extensive development of systems of railways in all the Provinces of the Dominion, by which it is now possible to communicate in a few days with many localities previously inaccessible, bring it within the power of all to obtain almost any desired information. It is my duty, however, to remind you that these advantages also bring with them their responsibilities, and I take the liberty, therefore, of suggesting certain lines of study in which I believe more work should be done by our members. Our monthly magazine still maintains its character as a high-class scientific magazine, and should be, as it doubtless is by most, carefully read by all our members.

I should, however, be glad to see some new names amongst the contributors. There are also certain orders of insects which receive little attention at our hands, and the work, although good, is being done by too small a number of workers. Amongst the lines of investigation which demand our attention, I would mention, first of all, the clearing up of the missing links in the life-histories of our common and conspicuous injurious and beneficial insects. There is a great deal yet to be done with regard to the common injurious insects, as cut-worms and wire-worms, etc. Again the advantages of easy access to the North-West Territories and British Columbia by means of the Canadian Pacific Railway must not be neglected. By the completion of this great highway, connecting the Pacific with the Atlantic it is now possible for us to receive eggs of nearly all the unknown species of our diurnal lepidoptera. The ease with which these can be reared from the egg has been explained in the *Canadian Entomologist* by our highly esteemed contributor, Mr. W. H. Edwards. The keen pleasure to be derived from breeding insects and watching them through all their stages can only be appreciated by those who have tried it. All I can say is that I, for my part, have never derived more true pleasure from any occupation. The excitement of catching the female, the anxiety to know whether she will lay eggs and whether these will hatch, then watching the small larvæ through their successive moults till they are full grown, and the final emergence of the perfect insect, all are intensely interesting. Now the large number of Canadian lepidoptera of which the preparatory stages are unknown, but of which we could with comparative ease obtain eggs, should surely induce some of us to make a great effort to clear up some of these points. Let us, at any rate, try to have a few of them disposed of before the next annual meeting.

Another study of enormous importance which might well receive more attention is that of the dipterous and hymenopterous parasites of injurious insects. Mr. Harrington, of our Council, has done good work in this line. The Abbé Provancher, of Quebec, has also in his excellent little magazine, *La Naturaliste Canadien*, published lately much valuable information concerning both the hymenoptera and the hemiptera.

In this connection I would mention a curious discovery made during the past summer. In examining the seeds of the common Canada thistle with a view to finding out the extent of their fertility, I was surprised to find that in nearly every head most of the seeds had been destroyed by a white dipterous larva, which was generally placed head downwards, only showing a brown disk with two pores on the upper end. It had a peculiar habit of enveloping itself with the pappus of the thistle, which was wrapped tightly round it, as though the larva had twisted itself round and round and drawn the silky pappus with it until a thick wad was formed. This is probably as a protection during the winter, for most of these larvæ were mature, and some which I have in breeding jars remain quiet in these coverings. I was naturally much interested in this beneficial insect which had suddenly developed in such large numbers; but my surprise was great when I found that from upwards of 200 specimens collected, most of them produced a small parasitic hymenopterous fly of a kind unknown to me. We had then the somewhat paradoxical result of an insect parasitic upon another insect being noxious; but

such it undoubtedly is. From all the thistle-heads mentioned, I only obtained one pair of the flies, the larvæ of which were destroying the seed of this troublesome weed (they apparently belong to the Trypetaceæ), all the rest produced the little black parasites. Later in the season, by examining a large number of plants, I secured a few specimens of the larvæ which appear to be healthy, and these are all wrapped tightly in their coverings of thistle down. There were sometimes as many as three larvæ in one head of seed, but as a rule only one. Through the kindness of my friend, Mr. Harrington, the small parasite has been sent to Mr. W. H. Ashmead for identification.*

During the past year several notable collections of insects have been made in unworked districts of Canada, amongst these I would make special mention of those by Prof. Macoun and Rev. G. W. Taylor, in Vancouver Island; Mr. J. M. Macoun, in Hudson Bay; Dr. G. M. Dawson, near the Alaskan boundary; Mr. J. D. Evans, at Sudbury, Ontario; Messrs. J. B. Tyrrell and Dowling, in Manitoba; and Mr. N. H. Cowdry, at Regina and near Fort McLeod.

Several publications worthy of a much longer notice than I have now time to give them, have appeared during the past season. First must be mentioned the resumption of publication of Mr. W. H. Edwards's "Butterflies of North America." From the Division of Entomology at Washington, several reports and bulletins have been issued. Prof. Cook, of Michigan, and Prof. Forbes, of Illinois, have both issued timely publications of great utility, particularly bearing upon the use of arsenical poisons as the best remedies for the codling worm and plum curculio. Prof. F. M. Webster, of Purdue University, has done good work amongst the insects injurious to wheat crops, and has brought his practical common sense to bear upon some of the troubled questions with good results. From the American Entomological Society, has come Mr. Cresson's much wanted Classification of the Hymenoptera, a work which will be found of the greatest use to students.

Prof. Grote's "Hawk Moths of North America," which, although complete in itself, is a part of a series of essays on North America Lepidoptera, will be found a useful work for collectors. It is to be hoped that this talented author will soon issue a further part of his work. Mr. Scudder's great work on the Butterflies of New England, is announced for next spring. From the well known excellence of this author's work, it is needless to say that it is anxiously looked for by Lepidopterists.

I must now pass on to a brief sketch of the most noticeable injuries by insects during the past season. The crops in Canada, notwithstanding the excessive drought, have not suffered from any very severe attack of insects. The wheat midge continues to levy heavy tribute from the farmers' wheat wherever this cereal is cultivated, but only amongst the best farmers in the Province of Nova Scotia has it become sufficiently abundant to induce them to burn the screenings. Throughout Canada, from the Atlantic to the Pacific, the tent caterpillars (Clisiocampa) have been most injuriously abundant. I received, during the month of June, most doleful accounts of their ravages; whole groves were stripped bare, and few trees seemed to come amiss to them. Along our streets here, hardly a tree could be found without its nest of caterpillars. The advocates for the English sparrow received a rude shock in observing their neglect of this large supply of, what they supposed would be, such acceptable food. I must, however, in all fairness to these little usurpers, record that on the 26th May last, I did actually see a little cock sparrow worry to death and afterwards devour with apparent pride and great gusto, a full grown larva of *Clisiocampa Americana*, which was endeavouring in a great hurry to cross a path unobserved.

The wheat crop of the Dominion for the past season has been enormous and of very fine quality. This is chiefly owing to the vast quantities of this staple grain produced in Manitoba and the North-West Territories. Throughout Ontario, however, the excessive drought has prevented the maturing of the seed to a large extent. Complaints of the operations of the wheat midge and Hessian fly have been reported from some localities, and the former of these has made itself too apparent in Nova Scotia and New Brunswick. The wire worm has done its share of destruction, but on the whole the injury to wheat

*It has since been named *Solenotus Fletcheri* by Mr. Ashmead, and is the first representative of the genus as yet discovered in America.

has been inconsiderable. Perhaps the insect of most interest is the "Wheat-stem Maggot," the larva of a small fly known to science under the name of *Meromyza Americana*. This insect has been observed during the past three years, but nowhere in very large numbers, and only a few complaints have been received of its operations; but, on the other hand, it is found upon enquiry, that it has been seen in a great many localities, and, moreover, it appears to be steadily increasing in numbers. In some localities in the Ottawa district where, however, it must be stated most enquiry has been made, it is reported to have been present for years. Dr. Ferguson, M.P. for North Leeds, states that it is always most prevalent in good seasons, and when there is great drought and a small crop the insects do not appear in such large numbers, but when the growth is vigorous and there is a good deal of moisture, they appear almost invariably. As this was an exceptionally dry year, should this theory be correct, I fear we may, in an ordinarily moist season, anticipate a severe attack from this insect. There are two distinct kinds of injury committed by this insect. The presence of the larva of the second or summer brood is indicated by the top joint of the wheat turning white just about the time the wheat is in blossom. This character is very noticeable and has gained for it the name of "Silver-top" in some localities. The other kind of attack is that by which the larva destroys the young central shoot of the autumn grown plants of fall wheat.

Dr. Ferguson states that the usual course amongst farmers in his constituency, has been, where they are general, to put the mower in and cut the crop. This. however, is a severe remedy to which it has not often been necessary to have recourse.

Mr. D. James, of Thornhill, in the County of York, states that it works particularly in the variety known as "Goose spring wheat," and says, "It is three or four times worse in my fields this year than last. At a rough estimate about every thirtieth head is affected, and it may prove more than this."

This information is sufficient to show that it is an object requiring special study.

The life history of this insect is briefly as follows:—The eggs are laid on fall wheat in the autumn—in September and October, these hatch and pass the winter in the larval state, and in the following spring produce, in June and July, the perfect insects. It is supposed by Prof. F. M. Webster, of Purdue University, Ill., that these lay their eggs in volunteer wheat, and that these again produce the injurious brood which attacks the autumn fall wheat. Another supposition is that the perfect insects remain alive until the fall wheat appears above ground. This, however, seems hardly likely, and if Mr. Webster's theory be not correct, it is probable that the gap is bridged over by the existence of a brood in some of the wild grasses.

Timothy hay has for the last few years suffered severely from a similar injury, by which the top shoot is also destroyed, and the records of the two attacks are much mixed up.

I have failed in my efforts to breed this insect to maturity. I am, however, at present of the opinion that it is not the Meromyza. The remedies which suggest themselves for Meromyza at the present stage of the investigation are *late sowing* of fall wheat and clean cultivation, by which all volunteer wheat is destroyed.

From the similarity of the attack by the autumn brood to that of the Hessian fly, I feel confident that the two are sometimes confounded by farmers. The larvæ and pupa cases of the two are, however, very different in appearance. The Hessian fly, I am thankful to say, is not very injurious in Canada at the present time; but in parts of Illinois it has lately committed great depredations. The outbreak of this pest, which occurred in England last year, has drawn much attention to entomology in that conservative country, and the name of one of our honorary members, Miss Eleanor A. Ormerod, is now more than ever a household word amongst the grateful farmers, whom, by her prompt action and safe advice, she has put in a position to protect themselves against this scourge. I am still however of the opinion, notwithstanding the present state of affairs, that the Hessian fly will never become a "first-class pest" in England. As well as Miss Ormerod, Mr. Whitehead continues to write and publish valuable advice to the farmers on injurious insects. It is to be hoped that they may be awakened to see the value of his words and follow the instructions he so plainly gives.

The injury to other grains has been small, and with the exception of the as yet

unexplained "silver-top" injury to hay, this crop in Ontario has not suffered. The clover seed midge is now by early cutting comparatively well kept in hand by growers.

The root crops have been poor for want of rain, turnips suffered severely and late in the season all growth was stopped in some districts by enormous quantities of a grey aphis. When treated in time these were easily destroyed by spraying with kerosene emulsion. Few, however, could be induced to take this trouble so late in the season; preferring to take their chance they did nothing, and as a consequence lost their crop of turnips.

Carrots last year were badly attacked by the carrot fly (*Psila rosæ*), but this year very few complaints were received. Radishes and cabbages were badly attacked by Anthomyian flies, so well known to gardeners as root maggots. I have, however, during the past summer had such success with Prof. Cook's carbolic acid treatment, that I had no trouble in growing radishes entirely free from attack, right through the summer. This remedy consists of one gallon of water in which two quarts of soft soap have been dissolved. Into this when boiling hot one pint of crude carbolic acid is put, and after being boiled and stirred for a short time, is put by in bottles. When required for use I put one cupful in a watering can with fifty cupfuls of soft water. This when stirred up a little is ready for use, and is watered by means of a rose all over the beds, beginning three days after the seed is sown and continuing once a week until the radishes are ready for the table. It can be watered all over the foliage and will have no effect, either on the vegetation or in giving any offensive taste to the vegetable. For cabbages the most successful treatment was as follows:—At the time of planting out gas-lime was sprinkled lightly all round each plant. About first July the earth was well hoed up round the stems and another light application was made. This substance was also found very beneficial by Mr. E. Bell, of Archville, in preventing to a large extent the attacks of the onion maggot. In this case it was sown very lightly broadcast over the whole bed—once a fortnight,—from the beginning of the season until the middle of August.

Potatoes suffered in some localities from the Colorado potato beetle. This pest, however, is so easily and cheaply kept down with Paris green that it is not necessary to speak of it at greater length.

The imported white cabbage butterfly (*Pieris Rapæ*), committed serious injury throughout the Province, notwithstanding the fact that myriads of the larvæ were destroyed by the fungous disease known as *flacherie*. This disease has been noticed for the last seven or eight years from the virulence of its attacks upon the larvæ of this insect; but this year the caterpillars having appeared in undue numbers, its presence seemed to force itself upon everyone's notice. Great injury was done by these caterpillars before the epidemic developed and it was necessary to have recourse to active remedies. Of these, without doubt, insect powder (*Pyrethrum*) is the best. This material can be mixed with four or five times its weight of common flour. With one of the many insect-guns and a very little practice, a large number of plants can be dusted in a short time Treatment with a tea of this poison was not so successful as the dry application.

Orchards have in some districts fared worse than other crops. In the first place the leafing out of the trees was retarded in early spring by the want of rains. The enormous numbers of Clisiocampa and a goodly host of other caterpillars, at one time threatened to entirely strip the foliage from the apple trees. In Nova Scotia the apples were from various causes reduced to one-quarter of the average crop. Two particular insects were most complained of, "the canker worm" and the pear-blight beetle *Xyleborus dispar*, Fab., (*Xyleborus pyri*). This latter was called, locally, "the shot-borer," from the resemblance of its tunnels to small shot holes. It has done much injury. Many specimens have been sent to me from the Annapolis Valley, and by the kind assistance of Mr. T. E. Smith, of the Nova Scotia nursery at Cornwallis, N.S., a close and careful observer, I have been put in possession of much useful knowledge with regard to this insect. Mr. Smith is under the impression that they do attack healthy trees. He writes: "One of my neighbours has lost about forty fine healthy apple trees, mostly Gravensteins and King of Tompkins. They attack the butt, and in some cases well into the limbs of young and bearing trees a foot.

in diameter, mostly on the north side of the trees." One specimen of apple wood cut from a branch two inches in diameter and apparently in a living condition, produced, as well as the pear-blight beetle, several specimens of *Monarthrum mali*, another injurious species somewhat resembling the above, but even smaller. A noticeable feature of every specimen of injured wood submitted to me was that the trees from which they were cut were very badly attacked by the "Oyster-shell bark louse." Opinions seem to differ as to whether these beetles will attack vigorous, healthy trees. Efforts will be made to induce the Nova Scotia fruit growers to treat their trees for the "Oyster-shell bark louse," which alone, without the assistance of these borers, are sufficient to rob the trees of much power for bearing fruit. Last spring I was much pleased at receiving from Mr. A. J. Hill, of New Westminster, B.C., some twigs of apple covered with this bark louse, which, when enclosed in a breeding jar, produced hundreds of the useful little parasite *Aphelinus aspidiotidis*. Every scale seemed to be destroyed. After saving a few specimens for the cabinet I turned the others loose in an infested apple tree, and hope next year to find that they are established here. In our own Province by far the worst enemy the orchardist has had to contend with is the codling worm (*Carpocapsa pomonella*.) There is now no doubt that the use of arsenical poisons is the only practicable remedy for this pest. I refer to it now for a special reason. In the *Canadian Horticulturist* for August appeared what I cannot but consider a most injurious and ill-advised article. In it the writer, who, by the way, does not give his name, writers of such articles seldom do, makes several bare statements without giving any proof, warning fruit growers against using arsenic in any form, and draws a vivid picture of the ills which may come from neglecting his advice. This article will be answered in full elsewhere; but I wish to draw attention to two of his statements, viz.:

"That although the mineral arsenic is insoluble in water it is freely soluble in the . . . . acids resulting from decomposition of vegetable matter —and is then readily taken up by the roots of plants, especially by those of the coarser vegetables, as the potato, etc."

"Similarly also, in applying solutions of Paris Green to the apple blossom, it is not only that the petals are destroyed, but the poison may be absorbed by the fruit—"

Now the injury of this article is this: In the first place the statements are inaccurate and secondly being published where it is, it will be read by a large class of people who will not be able to detect the inaccuracy, and who sooner than run any risk will let their crops be destroyed so as to be on the safe side, and besides this there is no doubt that it is less trouble not to make this application, and we all know how easy it is to take a ready-made excuse for not doing a thing which we know ought to be done; but if there is the slightest doubt about the propriety of an action we seldom even need an excuse to be prepared for us. Now, Entomologists have been for years trying to persuade fruit growers to save their apples and plums by using these arsenical poisons, and Prof. Forbes has shown by most careful experiments, that at least 75% more of a crop can be preserved by their use than by leaving the trees alone. Fruit growers were just beginning to be awakened to the value of these remedies when "C." (of Durham, Ont.), comes out with his injurious article. In answer to it I say—if care be taken to apply this remedy as directed by Entomologists *no* danger can result from its use. As to its being absorbed into the potato tubers, "C," seems to forget that these bodies are not roots, nor are they filled from the roots. They are merely swellings at the ends of underground stems, such as are known to botanists as "winter-buds," and are reservoirs for the storing up of reserve material chiefly *taken in by the foliage* for the use of the next year's growth. Even then were it possible for any appreciable amount of the arsenic to get to the roots and be absorbed by them, which I very much doubt, it would be impossible for it to get into the tubers. Prof. Cook, of the Michigan Agricultural College, had some very careful analyses made of plants specially treated with arsenic. Paris green was put on the foliage as strong as possible without killing the plants, and it was also put on the ground where it would be worked to the roots. Both vines and

tubers were analysed by a very careful chemist, but not a trace of arsenic could be found. Again, with regard to the injury to apples, the poison should not be applied until after the petals have fallen, and when consequently the ovaries are fertilised and the stigmatic disk is incapable of absorbing anything, much less a caustic solution of arsenic.

. . . . . .

Here the general broad principles upon which insect remedies are applied was explained and listened to with interest.

. . . . . .

Before closing the President said,—"It is with feelings of the deepest regret that I have to refer to a severe loss our Society has sustained since the last meeting in the removal by death of one of its most active and esteemed members, Mr. George J. Bowles, of Montreal. This gentleman was for several years a member of the Council, and was also, at the time of his death, the President of the Montreal Branch, in which he always took a keen interest, and in the foundation of which he took an active part. His quiet, modest manner made him a favourite with all his associates, while his ability as a naturalist was acknowledged by every one who had intercourse with him. He was a regular contributor to the publications of the Society, and also prepared many valuable papers for the Montreal Branch.

He paid particular attention to the lepidoptera, of which he had extensive and choice collections both of Canadian and exotic species.

Mr. Bowles was a native of Quebec, where he was born in 1837; he leaves a wife and three children, for whom, in their bereavement, our deepest sympathy is called forth.

Another of our members who has passed away is Mr. Charles Chapman, of London. Mr. Chapman as well as taking an active interest in our Society, was also a patron of art, and has been styled the Father of the Western Ontario Art School.

In closing, I wish to draw special attention to the beautiful collection of Coleoptera exhibited by Mr. Harrington this evening, and this collection, I think, will illustrate some of the points upon which I have spoken to-night. The method and care with which they are arranged, and the neatness with which all are named and mounted, point out far better than I can explain the educational value of the study of Entomology.

JAMES FLETCHER.

ELECTION OF OFFICERS.

The election of officers was then proceeded with, and the following gentlemen were duly and unanimously elected :—

President—James Fletcher, Ottawa.
Vice-President—E. Baynes Reed, London.
Secretary-Treasurer—W. E. Saunders, London.
Librarian and Curator—E. Baynes Reed, London.
Council—W. Hague Harrington, Ottawa; Rev. T. W. Fyles, Quebec; J. Alston Moffat, Hamilton; J. M. Denton, London; Rev. Geo. W. Taylor, Victoria, B.C.
Editor *Canadian Entomologist*—Rev. C. J. S. Bethune. Port Hope.
Editing Committee—Prof. W. Saunders, Ottawa; J. M. Denton, London; Dr. Wm. Brodie, and Capt. Gamble Geddes, Toronto.
Auditors—J. M. Denton and E. Baynes Reed, London.
Delegate to Royal Society—H. H. Lyman, Montreal.

THE COTTON MOTH IN CANADA.

Rev. C. J. S. Bethune, of Port Hope, read the following paper :—

It may seem at first sight somewhat out of place to bring before the Entomological Society of Ontario an insect whose name and food-plant are so essentially Southern as the Cotton Moth—*Aletia xylina*, Say ; *A argillacea*, Hubn. It is, however, by no means an uncommon insect in this Province and other northern parts of America, and has this year occurred in large numbers at Port Hope. On the 7th and 8th of October I saw in the day-time many specimens of the moth in my garden, darting, when disturbed, from one place of concealment to another—generally the shelter of a fallen leaf. On Sunday, the 9th, a warm, damp evening, they were very abundant, being especially attracted by light ; and the next day I gathered up over 40 specimens underneath an electric street lamp, not far from my house, where they had been emptied out of the globe by the lamp-cleaner. The night before, I had noticed hundreds of moths flying about this lamp, pursued by the usual attendant bats, and waited for below by the expectant toads. Most of these must have been Cotton Moths, as I found only one specimen of any other insect among the more than two score that I gathered up the next day. At the same time, viz., on Oct. 8, 9, and 10, the shore of Lake Ontario, about a mile to the south of where I live, and a little east of Port Hope harbour—was covered with the same moths, evidently washed up by the waves. Some were alive, some nearly drowned, but the great majority dead.

The question that I wish to bring before the Society is, Where did all these Cotton Moths come from? Have they flown up from the South on the wings of the wind, or are they natives of our own country? Were this the only instance of their appearance here, I should answer at once that they must have come to us from the cotton fields of the Southern States, where they are always excessively numerous and destructive. But many of my friends, as well as myself, have repeatedly found this moth in abundance in Canada. As long ago as 1865 I observed it in great numbers late in September on fallen fruit, and nearly every year since it has been more or less common in the autumn. It has been found here in Ottawa, in Quebec, in various parts of Ontario, high up in the Adirondack mountains in the State of New York, at Racine in Wisconsin, etc., always in the autumn, late in September or in the beginning of October.

Professor Riley, Chief of the Entomological Commission of the United States, and the highest authority on the subject in North America, is strongly of opinion that the moth migrates to these northern regions from the cotton States in the South. He considers that the insect possesses ample powers of flight for traversing such a distance, and believes that though it may breed for a season or two in Canada and the Northern States, it does not become a permanent inhabitant, but is really a purely Southern species. On the other hand, many northern Entomologists have agreed with me in thinking that the moth must live in the north as well as in the south, and must therefore feed upon some other plant besides the cotton—some indigenous member of the mallow family (*Malvaceæ*). Our reasons for this opinion are (1) That the moth is so common over the whole of the north, from Maine to Wisconsin ; (2) That the specimens we find are perfectly fresh, with their wings entire, and the scales unrubbed—without, in fact, any indication that would lead one to suppose that they had just arrived from a flight of a thousand miles ; (3) That a specimen was taken by Dr. Hoy, in Wisconsin, with the fore and hind wings on one side in a deformed and crippled state, evidently showing that it had recently emerged from the chrysalis, and that it could not have flown any distance ; (4) That a female was captured also by Dr. Hoy near his residence at Racine, about the middle of June.

The fact that I mentioned at the outset that vast numbers of the moth were this year washed up on the shore of Lake Ontario, seems at first sight to tell against our view and to strengthen that of Prof. Riley. But after all, we have no evidence to show from which direction these moths came, whether they were flying across the lake from the south and fell into the water when near the northern shore, for they could not have been floating for any great distance, or whether they were blown at night off the land

into the water. I am myself strongly inclined to the latter opinion, because we so often find at Port Hope large quantities of insects washed up on the lake-shore at different times in the summer, and as far as my observation goes, always on the days following a stiff northerly wind or squall during the preceding night. We have found, for instance, in June, hundreds of specimens of the large green Carab, *Calosoma scrutator*, (Fig. 1)—usually a very rare beetle indeed—and others of the same genus; these are carnivorous insects, feeding upon caterpillars and other destructive creatures, and are said to especially frequent wheat fields at night. There has been no extraordinary occurrence of these beetles in the State of New York that I have ever heard of, and the prevalent winds, especially at night, have not led me to suppose that they could have got into the lake from any other quarter except from our own fields.

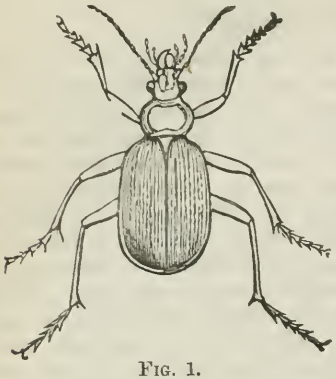


Fig. 1.

This question about the Cotton Moth has been several times discussed at meetings of the Entomological Club of the American Association, and so far we have not been able to arrive at any definite conclusion. My object in bringing it before our Society to-day is to try and enlist the services of Canadian entomologists and botanists in settling the question finally. What we want to ascertain is whether the insect breeds in this country, and if so, what its food-plant is. The Cotton-plant (*Gossypium herbaceum*) belongs to the Mallow family (*Malvaceæ*), and therefore we naturally expect the caterpillar of the Cotton Moth to feed upon one or more plants of this botanical family. There are none, however, indigenous to Canada, but several are common in gardens, such as the Hollyhock, and Hibiscus, and the Mallow weed. We should be very glad if all our botanists, as well as entomologists, would keep a look out upon plants of this family next season, and report at once if they find them infested with caterpillars of any kind. I have no doubt that our President, Mr. Fletcher, will willingly undertake to examine and identify any specimens that may be sent to him, and I shall be glad to do the same, if it is found more convenient to communicate with me.

Before closing, it may be interesting to mention that the destructiveness of this insect in the cotton fields of the South is almost beyond belief. Prof. Riley shews in his report, from carefully obtained statistics, that during the fourteen years succeeding the civil war in the United States the average number of bales of cotton produced amounted to 3,449,200 per annum, and that 594,497 bales were lost during the years of worst attacks by this insect; the value of these bales, at a low average price, was no less a sum than $29,711,000! Of late years the percentage of loss has been much diminished by the use of Paris green and other arsenical poisons, for which the planters have very largely to thank their entomological friends. The loss in 1881, for instance, is computed at 193,482 bales, worth a little less than $9,000,000—a saving of about twenty millions of dollars per annum. Much of this improvement may undoubtedly be placed to the credit of entomologists, and certainly the country gets back many hundredfold the few thousand dollars spent upon this branch of economic science.

Prof. Macoun suggested the basswood tree as a possible food-plant of the larvæ, because there were not in the district sufficient malvaceous plants to furnish food for such numbers of insects.

Mr. Fletcher said that careful search had been made for several years on this tree, as well as on all plants allied to the cotton plant, but no traces of larvæ had been found. He had hitherto been inclined to believe that the moth bred in Canada, and that the theory of migration from the cotton States was not tenable, but what he had learned concerning the appearance of these insects this autumn had somewhat changed his views.

Mr. W. Hague Harrington stated that the appearance of the moths had been very noticeable at Ottawa at almost the same date as they were observed at Port Hope. The first week of October had been comparatively wet, with calms and light winds varying from east through south to west. Sunday, 9th October, had been a remarkably mild day, and on that evening the moths had swarmed at some electric lights. On the following morning he had observed upon the front of the Ottawa Bank a great number of moths, at least 250 or 300. The building faced the north, being situated opposite the Parliament Square, and had in front of it an electric light. Moths were also seen at several points in the city, but not in any great number. From the fresh, unrubbed condition of all those seen he then thought that they could not have flown far, and that possibly they might have been bred upon some of the plants on the Government grounds. Since hearing Mr. Bethune's paper, however, he was more inclined to favour the migration theory.

Mr. J. Alston Moffat reported that on Friday night, 7th October, immense swarms had appeared at Hamilton. He was informed by a friend that on that evening they had been around the electric lights literally in millions—the number being so great that he could not attempt to give an idea of them, other than by saying that all the insects previously observed by him were as nothing in comparison. Mr. Moffat visited the section of the city where they had been most numerous, on the following afternoon, and found the ground for a space of several yards around each electric light pole covered with these insects, every inch having at least one moth. Immense numbers had been crushed under foot, but the rest were lively, and darted off in their accustomed manner when disturbed. That night they were very abundant, but Sunday evening was wet and their numbers were lessened.

Mr. J. M. Denton said that in London the moths had not been observed, although there was an electric light quite near his house.

After the discussion the general opinion of the meeting was that a migration seemed indicated, and it was resolved that endeavours should be made to find out if the moths had been observed at points intermediate between Canada and the Southern States.

Mr. Fletcher exhibited some beautiful paintings, kindly loaned by Mr. Scudder, of four species of Thecla, viz., *strigosa*, *acadica*, *calanus* and *Edwardsii*, and he also showed specimens of several species of these butterflies, and pointed out the points of distinction or affinity.

It being one o'clock, the meeting adjourned until 2.30 p.m.

The afternoon session opened by the reading of a paper contributed by Prof. E. W. Claypole, "Suggestions to Teachers on Collecting and Preserving Insects," followed by two by Capt. Gamble Geddes, on "Several Remarkable Captures during the Summer of 1887 in Ontario," and "Notes on the Genus Argynnis whilst Alive in the Imago State."

SUGGESTIONS TO TEACHERS ON COLLECTING AND PRESERVING INSECTS.

BY E. W. CLAYPOLE, AKRON, OHIO.

In a short paper which appeared in the *Canadian Entomologist* in July last, I mentioned my own experience on the value of gasoline for killing insects for the cabinet. The hints then given were not intended to be of service to professional Entomologists, if there are any such persons, or to amateurs possessing abundance of time and means, but to students and to teachers with whom time is short. I pointed out its superiority over chloroform and cyanide of potassium in rapidity of action and in safety, while its use is attended with no injurious effect on the specimens. I now wish to add a few words with especial reference to the preservation of collections after they have been made.

Here, too, I desire to make it plain at the outset that these hints are also intended mainly for the hard worked teacher or professor whose attention is probably distracted

by being compelled to teach not only Entomology, but also all the Natural Sciences—a load amply sufficient to keep several men busy.

For my own part, after many years of alternate collection and loss of Entomological specimens, I almost abandoned the effort in despair after finding some of my cases filled with webs, cocoons and moths of *Tinea pellionella*, etc., and most of the specimens either destroyed or badly damaged. The task seemed hopeless without more time and attention than I was able to give. I may say that I had for some years been using gasoline to kill specimens, but here my use of it ended. Knowing, however, and feeling the utter impossibility of teaching Entomology without specimens, I began to consider if it was not possible to devise some fairly easy method of keeping my cases free from these and other pests, so as to bring the labour within reasonable limits. I first reduced their capacity, in order that they and their contents might be as compact as possible, and also that "all the eggs might not be in the same basket." My cases are now made about twenty inches by twelve, and about one inch and a quarter in depth. Their sides and ends consist of black walnut, well jointed and about one inch thick. The glass top is set in a rabbet with putty, and is consequently quite insect-proof. The back consists of soft pine or tulip wood about three-eighths of an inch in thickness, and is attached to the frame by twelve screws. This back, when covered with a coat of manilla paper, is generally soft enough to take and hold the pins. But in addition I often line the bottom with sheet-cork, or as the cost of this material soon mounts too high, when as many cases are made as even a small cabinet requires, I generally employ instead of it some one of the forms of packing that are used by druggists—either the strawboard with a backing of cork chips, or the corrugated paper made by Thompson & Norris, of Islington, London, and Prince Street, New York. Either of these is very effectual, nearly as good as sheet cork, and merely nominal in price.

By setting the glass myself and doing any finishing required for effect, I can obtain these cases at about sixty cents each, and in this way a collection, amply sufficient for all the purposes of teaching, may be set up for a comparatively small outlay.

By screwing the back tight up and avoiding opening the cases except in the cold weather, I largely reduce the chances of mischief. All the specimens obtained during a season are placed in a temporary case until the time for assorting arrives.

It is, of course, impossible in collecting, and especially in exchanging, to totally exclude parasites. Indeed, it is more than likely that many insects are infested when they are caught. The disinfection of every specimen singly is a very tedious process, and in my own experience proved a very serious barrier to collecting. I therefore now arrange all the specimens in their desired places without regard to their condition in this respect, and then disinfect them wholesale in the following manner: I have a zinc tray of rather larger size than the cases, and about two inches deep. This I fill with gasoline and then set the whole case, or at least the back, with its charge of insects in it, and allow it to soak for a few minutes until everything is saturated with the liquid. Two or three minutes are usually quite sufficient. I then remove them, drain off the superfluous gasoline, and in a few minutes they are dry and ready to be set back and screwed up again.

By this simple means I secure the purity not only of the insects, but of the case also, from parasitic life, for nothing living can endure this ordeal. So far as opportunity has offered for observation I believe that the operation is equally fatal to eggs.

I need hardly remark that there is no trouble to be apprehended with any order except the Lepidoptera. Even with these I do not hesitate to employ the same method, and find no ill effects from it. Their delicate plumage is not perceptibly injured by free saturation with this very volatile liquid.

Since adopting this plan, I find it only necessary to glance over my cases occasionally during the summer, and if the eye detects any sign of mischief, even the minute dust that indicates the presence of the mite (*A. divinatoria* or *pulsatoria*), I take out the case, loosen the back screws, and place the whole in the gasoline. In five minutes it is replaced with the certainty that all life is extinct.

As I said at the outset, Entomologists with plenty of time will not probably feel much interest in the suggestions here made, but I find, in my own experience, that the

plan above recommended has so far reduced the labour of the work and the disappointment incident to it, as to lead me to hope that I shall be able to prepare and keep a collection of insects in the future without much more outlay of time and thought than is required for a collection of dried plants. I think if other teachers who, like myself, are short of time and distracted by teaching several subjects, will adopt the same plan, their verdict will be equally favourable.

The cases, too, are convenient, and can be handed round a class for inspection without risk, while they make a handsome appearance in the museum, and from their neatness and showiness and cheapness, they form a strong inducement to the students to undertake a collection on their own account—no small argument with the practical teacher.

Note.—At the close of a few remarks made by the author on this subject before the Entomological Club of the American Association at its recent meeting in New York, an entomological friend objected that he had found gasoline ineffective to kill many insects, and instanced the Catocalas as an example. By a rather curious coincidence, the last specimen that I captured before leaving for the meeting was one of these, the Red Underwing (*C. ultronia*), and the first that I captured on my return was the same. In neither case was there the slightest trouble; the insect succumbed immediately. I may remark that, in my own experience, I have found the Tigers (*Arctias*) the most refractory, requiring, in some instances, two applications. In most other cases death is almost instantaneous. So effective and so convenient do I find the gasoline that I have for years abandoned the use of the more cumbrous and dangerous appliances and now carry only an ounce phial of this liquid with me into the field.

SOME REMARKABLE CAPTURES IN ONTARIO.

By Gamble Geddes, Toronto.

The following paper was read on some remarkable captures during the summer of 1887 in Ontario, by Capt. Gamble Geddes, of Toronto :—

Pelecinus Polycerator, Say.—I had the good fortune to take the male of the above species at Eastwood, Ontario, about the 11th of August. I captured one and saw a second a few minutes later, which, however, proved too quick for me, and I missed it with the net.

I have never observed that the females of this insect fly very high, but that the the males *do*, I have no doubt, as the one I caught was very quick and started to fly straight up in the air over my head, whilst I barely reached it inside the hoop of a long-handled net. The male that I missed capturing, immediately soared aloft and out of sight amongst the high branches of the trees.

I may say that I have watched by the hour for these rare males where the females are in the habit of congregating in large numbers, and have never seen but the two specimens above referred to, *alive*. The only other one I have seen was captured by Dr. Brodie, in 1886, at Toronto.

If any of your subscribers know anything of the life-history of these insects, the information would be most acceptable to many readers of the *Entomologist* in Ontario, as I have made several enquiries, as to their habits, with little or no success. There is no doubt that the female is slow in her flight, and that she is handicapped by the long abdomen that she is obliged to carry with comparatively diminutive wings. It is no wonder that she is not fond of moving about when the wind is blowing, for she is knocked about and quite unable to preserve a straight course from one point to another, whilst the male with his short club-shaped abdomen, has wings equally large, and to all appearance, stronger than the female and can go as he pleases.

The female does not appear to be capable of long flights, my observations going to prove that when flying from one tree to another at any considerable distance, she will drop into the grass for a rest, about half way, and then after remaining in perfect repose for several minutes, she will clumsily struggle free of the grass and complete the journey. Here, lighting on the leaf of a tree, she moves about selecting a sunny spot, where she sits with her abdomen curled up, enjoying the sunshine and the breeze.

Colias Philodice, Godt.—(Fig. 2, male; Fig. 3, female.) At Erlescourt, Davenport, Ontario, in the early part of September, 1887, I captured a large number of a very dimin-

Fig. 2.

Fig. 3.

utive form of Col. Philodice male *and only two females*, one being a small albino variety, corresponding exactly with the commoner large albino. These two small females were laying their eggs upon lucerne (*Medicago sativa*), and I am curious to know if any of our collectors have made any observations with regard to the effect of this food-plant upon the size of the larvæ of C. Philodice. It is a curious fact that in this field of lucerne I should take all these small specimens, whilst about 300 yards from the same spot the common large Philodice was plentiful upon red clover.

Catocala Relicta, Walk.—In sugaring for Noctuids, etc., the past season, I have been fortunate in obtaining excellent examples of these lovely creatures, (Fig. 4) varying in the

Fig. 4.

black and white markings of the upper side in a remarkable manner. Whilst some are nearly all black and dark grey, with very little white about them, others are snowy white with very occasional black patches. In a single pine grove, not fifty yards in length, I captured as many of these Relictas as I have done in three or four years by trying orchards and woods. The place is very dark and the wind almost entirely excluded by the close growth of the pines, and it may be useful to collectors to observe this in future when sugaring.

Papilio Cresphontes, Cram.—There have been several occurences of this butterfly (Fig. 5) in the County of Oxford this year. I should be glad to hear from the members

Fig. 5.

whether any specimens have been taken during the past summer in other localities in the Dominion of Canada generally, and especially the Provinces of Ontario and Quebec.

In the discussion which followed the paper, Mr. Moffat described his own capture of the male of *Pelecinus polycerator*, and Mr. Fletcher described the unusual abundance at Ottawa of *Colias philodice*. At an excursion of the Field Naturalist's Club to Brittania, a few miles from the city, the sandy shore of the Ottawa had been so thickly covered with them for a distance of several hundred yards, that at one stroke of the net he had captured 47, which, strange to say, were all males.

Prof. Saunders stated that he had made search near London for the larvæ of *Papilio cresphontes*, where it had formerly been captured, but without success.

Mr. Fletcher exhibited a fine collection of Canadian species of the genus Chionobas, and explained the great value of these insects on account of their rarity hitherto in collections. *C. Macounii* Edw. was a new species which had been collected by Prof. Macoun, at Nepigon, in 1885, and the Rocky Mountains in 1886. Closely allied to it was *C. Gigas* Butler, of which until the past summer only three specimens were known in collections. Other beautiful species exhibited and described were *C. Californica*, *C. Chryxus*, *C. Jutta*, *C. Varuna* and *C. Uhleri*, of which Prof. Macoun had taken specimens in the Rocky Mountains.

A pleasant and valuable paper by the Rev. George W. Taylor, of Victoria, B. C., was read, describing an ascent of Mount Finlayson, B. C., in search of *C. Gigas*, and the success which had attended the party.

VISIT TO THE HOME OF CHIONOBAS GIGAS, BUTLER.

The paper which follows was contributed by Rev. G. W. Taylor, of Victoria, British Columbia.

When my friend, Mr. James Fletcher, the Dominion Entomologist, was staying with me in May and June, 1885, we made an excursion together to Mount Finlayson (an isolated conical mountain, situated at the head of the Saanich Inlet, about ten miles from Victoria), which he thought must be the locality where the original specimens of *Chionobas Gigas* were taken by Mr. Crotch, in 1876. Our visit was on June 15th. Mr. Fletcher had been there previously in search of this butterfly on April 26th and May 22nd. On none of these occasions, however, did we capture Gigas, but we were well rewarded by taking many other species not previously seen by either of us on Vancouver Island. Amongst them my first specimen of the somewhat abundant (in British Columbia), *Parnassius Clodius*, which was mentioned by Mr. Crotch as the consort of *C. Gigas* at the time of his visit.

We concluded we were too early for the latter. Mr. Fletcher left for Eastern Canada the next day, and I could not find an opportunity of again visiting the mountain that year.

In 1886 I was at the same place with a couple of friends on June 29th, but though well repaid for our trouble in other ways, we caught not a glimpse of *Gigas*.

This year we determined that he should be caught if possible, and at last success favoured us.

A picnic was arranged for May 17th. Our party consisted of Prof. Macoun, of Ottawa, and his son ; Mr. J. W. Tolmie (an enthusiatic Entomologist), and about a dozen other ladies and gentlemen. Again no success : we were much too early.

We tried again on June 30th (this is a very late season for insects in Vancouver Island), and this time had better luck. Prof. Macoun and Mr. Tolmie were again with me and a party similar to the last.

We started from home betimes and were at Goldstream House, the nearest point by road, by eight a.m. There is a tiresome walk of some two miles through the forest to the base of the hill, and then a stiff climb of 1,300 feet to the summit. Our progress was slow on account of the ladies, but we had all accomplished the ascent, and enjoyed our luncheon by 12 o'clock. It was then that the first *Gigas* was sighted, and after an exciting chase captured by Mr. Tolmie. For several hours the hunt was kept up, and as a result we obtained between us six or seven specimens of our long sought-for butterfly. Only two of these fell into my hands, and one was forthwith sent to Mr. Fletcher that there should be no doubt as to its being genuine *Gigas*.

Prof. Macoun and his son spent several days at Goldstream, and secured several additional specimens, and Mr. Tolmie and I not quite contented with our success paid another visit to the mountain on July 12.

The day was much too dull for butterflies to be out in any numbers, but we managed to catch about six more, as well as a few other species of interest. All our specimens were taken on or near the top of the mountain. *C. Gigas* on the wing looks at first sight very much like a large *Argynnis*. and I am pretty confident that we saw one specimen of it on the first visit I made with Mr. Fletcher in June, 1885. That season was at least three weeks earlier than this, and as all our specimens this year were more or less worn I should say that the proper time for *Gigas* will be about the second week in June, and I think it will be found to occur commonly enough on Mount Finlayson, and possibly also on the many similar hills to be found in other parts of Vancouver Island.

The locality is not very easy of access, but it is a most interesting one both entomologically and botanically. Here are found no less than 15 out of our 20 native species of ferns, and many other rare plants, as will be seen when Prof. Macoun publishes the results of his season's work on the Island.

Here too, I have met with many interesting insects. Amongst them the following butterflies that have not yet occurred to me in the immediate neighbourhood of Victoria :— *Persius* (?), *Parnassius Clodius*, *Argynnis Rhodope*, *Lycæna Phileros*, *Lycæna Melissa*, *Nisoniades* and *Eudamus Pylades*.

The capture of *Gigas* brings the list of Vancouver butterflies to a total of 56 species. Next year if all is well, I shall make an effort to procure eggs so as to observe *Gigas* in its earlier stages. Caterpillars of all this genus are grass feeders, and should be full fed in ordinary seasons towards the latter end of May.

Prof. Macoun, who had accompanied Mr. Taylor, described the manner of flight of this butterfly (*Chionobas Gigas*), which was swift and ceaseless, as was the case with the specimens of *C. Macounii* taken at Nepigon; all the specimens taken, it may be added, of both these species, were males.

Mr. Fletcher exhibited three specimens of the rare *Papilio Nitra*, two taken by Prof. Macoun in the Rocky Mountains, the other by Mr. N. H. Cowdry at Regina, N.W.T.; also some interesting species and varieties of Colias, regarding which there was discussion by several of the members.

Attention was then called to the valuable paper by Mr. H. H. Lyman in the October number of the *Entomologist*, and the beautiful plate accompanying it. A series of the moths brought by different members of the Council was examined in connection with this paper.

Mr. J. Alston Moffat exhibited and distributed among the members specimens of two new species of moths which had been captured by him at Hamilton, and which had been described by Prof. Fernald and Prof. Grote respectively as *Proteoteras Moffatiana* and *Scopelosoma Moffatiana*.

Mr. Fletcher showed specimens of an Halesidota and of its larvæ, which had been very abundant and destructive upon the Douglas Fir in British Columbia during the past year. He also distributed a collection of Coleoptera sent from Vancouver Island for this purpose by Rev. G. W. Taylor.

Mr. W. Hague Harrington read a paper on the "Nuptials of Thalessa," describing the emergence and copulation of these the largest of our Hymenoptera.

THE NUPTIALS OF THALESSA.

W. Hague Harrington, Ottawa, read the following paper:—

For several years I have observed with much interest the oviposition of our large and handsome "long-stings," but not until this summer have I been able to witness their actions preparatory to this duty. Although the males are frequently numerous when the females are ovipositing, the sexes pay no attention to one another, and this fact led me frequently to wonder at what time mating occurs. Last year I had, in company with Mr. Fletcher, observed the males in strange positions, with the tip of the abdomen applied to the bark, or inserted in a crevice, and had suggested that they were awaiting the emergence of the female. The supposition was, however, not proven, and the actions observed were still a matter of conjecture, and for further observation.

On the afternoon of the 7th June last I visited some old maples (*Acer saccharinum*) for the special purpose of making observations on *Oryssus*. The trees are in different stages of disease and decay, and are correspondingly infested by such borers as *Dicerca divaricata*, *Tremex columba*, *Xiphydria albicornis*, *Oryssus Sayi*, etc., while they attract naturally numbers of our larger Pimplidæ, such as *Thalessa*, *Xorides*, *Ephialtes* and *Xylonomus*. Upon these trees during their season could generally be found many specimens of *Thalessa*, but I had never seen one emerge from its prison into the warmth and light of its adult existence. Upon a tree which for years had been much bored by *Tremex*, etc., I, upon the above date, saw several specimens of *T. atrata* and *T. lunator* ovipositing, and at some distance below them a group of males in an evident state of excitement. Three of these had their abdomens inserted more than half way under a flake of bark. Here, I congratulated myself, was an opportunity to ascertain whether

a female was about to emerge. With my knife I pried off the piece of bark, and beheld the head of an insect just appearing through the wood. The males had flown away when disturbed, and I was afraid that they might not return before the female emerged, but two came swiftly back and commenced to pay her attentions before much more than her head was visible. As soon as she was out of the burrow she was embraced by one, and copulation apparently followed, but did not last long, as she began to crawl up the trunk, and when I interfered to prevent her getting out of sight, the male flew away. However another was ready to take his place, and the pair were almost instantly *in coitu*. A few seconds later the female attempted to fly, and fell to the ground ; the male disengaged himself and flew away, and his partner then did the same, starting with a strong and rapid flight.

Visiting another tree not many paces distant, I saw a group of more than a dozen males of *lunator* in very evident anxiety and excitement, their long antennae quivering, and their whole demeanor evidencing some powerful emotion. I peeled off a piece of bark at the centre of attraction, but found no sign of any insect coming forth. An hour or so later, when returning from my ramble, the group was even larger, and several were probing a crevice within an inch of the space from which I had stripped the bark. Thinking that the female might be here, I cut off another piece of bark, but could find no signs of her, although the males were so excited as even to settle on my hands.

Proceeding to the tree from which I had previously seen a female emerge, I saw several males clustered about three inches from where she had come out. Two had the abdomen flexed and the tip inserted in a small aperture in the bark. Stripping off the fragment of bark, I found that a female was there, and had gnawed her passage so nearly through the bark as to have pierced the surface. The males fluttered excitedly around, and, as in the first instance, she was embraced before she was wholly emerged, and copulation was effected as soon as she was out. Being in a hurry, and wishing to preserve the specimens, I boxed them, the other males flying around me in great excitement until this was achieved.

Two days later I was able to visit the same locality for the purpose of making further observations on these insects. On tree number one I saw at some distance up the trunk a small cluster of expectant males. By standing on the top of a dilapidated and shaky fence, I was just able to reach the spot and with my knife remove the covering of bark. As my position was too precarious for comfortable observation, I secured the female as she emerged and carried her to another tree upon which were some males. As soon as she commenced to crawl up the trunk, she was eagerly followed and embraced by one of the more active males. Copulation took place with four different males—the female falling to the ground on each occasion, and being again seized as she crawled up —the last union continuing $2\frac{1}{2}$ minutes, after which she flew away unattended.

On proceeding to tree number two, I found a very large and strongly excited cluster of the males in the immediate vicinity of the spot from which I had cut the bark on the former day. They were about twenty in number, and were packed so closely together that those in the centre could scarcely be seen. Like the inmates of a burning theatre, they trampled over one another in their excitement. Displacing them with some difficulty, I hewed off a slice of bark and revealed the female cutting her way to a new life, her head being partially visible. Her ardent admirers immediately swarmed around and endeavored to get their abdomens down the burrow, an undertaking in which they impeded one another so greatly that the only result was wedging the female in and preventing her from emerging. The cluster was soon so dense that she was entirely hidden, and as there seemed no prospect of her getting out for some time under the circumstances, I began to drive off, or rather forcibly to remove one by one, her besiegers. After nearly all were removed, I saw that one of the few remaining had his abdomen inserted its full length in the burrow. As the female was still unable to emerge, I drove off the remaining males, and as soon as the way was clear she came rapidly out. There was instantly fierce rivalry for her favors, but eventually one stronger, or more agile, than his fellows, succeeded in his desires, the pair remaining about $1\frac{1}{2}$ minutes *in coitu*, after which the female ceased apparently to have further attractions.

The foregoing notes (written upon the second date of observation) show that the

males are able to determine where a female is making her way outward—some time, perhaps, as in the last case recorded, many hours before she appears. Whether this is ascertained by the sense of hearing or smell, or a combination of both, I do not attempt to say, but the antennæ are evidently largely used in locating her, as may be readily seen by the way in which the bark is examined with them. When there is a crevice or aperture, the male bends his abdomen—at the suture between first and second segments —until it is at right angles to the thorax, and endeavors to insert it in the said crevice or aperture. He has then the attitude of a female insect ovipositing. As has been mentioned, if the hole is large enough the abdomen will be fully inserted, and it is perhaps possible that copulation may take place while the female is yet in the burrow. On emergence she is immediately seized, the legs of the male clasping the yet unfolded wings with the abdomen, and thus preventing her from flying. From the large number of males always about at this season, it is probable that the female seldom, if ever, emerges unattended. After the very brief honeymoon, she is no longer an attraction to the opposite sex, and is able to proceed unmolested with her work of depositing the germs of a future generation. I may add that of the pair confined by me the male died the same or following day, while the female was strong and vigorous until she unadvisedly entered a cyanide bottle.

SPECIES, VARIETIES, AND CHECK LISTS.

A paper on this subject was read by J. Alston Moffatt, of Hamilton, as follows :—

That a very considerable diversity of opinion obtains amongst writers "On what constitutes a species?" is apparent to all readers of works on biology, and the discussions about species and varieties make it manifest that the question has not yet been settled to the satisfaction of all.

Therefore, when one is going to speak on the subject, the first thing he ought to do to prevent misunderstanding, is to give as clearly as possible the view he holds about the terms.

Mine is, that fertile progeny is an unmistakeable evidence of oneness of species, regardless of external differences, and that within the bounds of species as thus stated, a limit to variations cannot be set.

That breeding does, in some manner define species, seems to be acknowledged by all. For whenever it is proved, that diverse forms that were called species have a common parentage, they are by general consent termed varieties.

It is not possible in entomology to adopt, in every case, this the natural mode of determining species.

The scientific one of determining them by external marks, is the only available one at first, in most cases, but it is necessarily uncertain, for who shall say that there have not been, or may not yet be varieties of it found.

So that as knowledge increases, species are always liable to be turned into varieties.

Now here comes in a constant source of trouble; it seems that some consider it the proper thing to do, when various forms are proved to have a common parentage, to wipe out all the names but one.

I protest most emphatically as a collector, and in the interest of collectors, against this habit of abolishing names, simply because they cannot be called species.

The impression is getting abroad that we have too many species in our lists; that may be perfectly true, and yet it does not necessarily follow that we have too many names.

Mr. Grote, in his instructive article on "Representative Species," says,—"It is a little odd to notice, in this matter of varieties, how anxious some writers are to draw in the species of others,—and how indifferent they are about drawing in their own varieties." This sentence clearly indicates the unsatisfactory condition this whole subject is in.

I see that this process of "drawing in," is going on in every department of biology.

If it is not judiciously done, it is well calculated to inflict grievous injustice on the industrious workers that went before, and a corresponding loss and labour on those that come after.

Let us look how it works in practice; take as an illustration of the wrong done to the students and investigators of the past, and the loss sustained by the collectors of the present, an extreme but well known example, *Caberodes confusaria*, Hub., a moth that has been redescribed eight times at least, from the fact of its having a large number of distinct varieties.

A beginner takes one form, he gets it named *Caberodes confusaria*, Hub., he turns to his list, marks it off, and thinks he is done with it; takes another which he thinks is different, gets the same name for that, and yet another, and so on, it may be through the whole series; not a shadow of indication, it may be, in his check list to intimate to him that it was a variable insect he had to deal with, and his feeling about it will be one of confusion, if not of disgust.

Now, if the proper names of these varieties with the authority had been retained, a glance at his list would have warned him what he was to expect of this insect, and if he had access to the writings of these authors, he could easily have got the names for himself, thus getting the full benefit of the labours of those that went before him, but as it is at present, these are as good as lost to him, and he has to go over the same ground again for himself; this does not look like advancing science, but a throwing away of advances gained.

Synonyms, of course, must go, but where a variety has been named, even if it be but the extreme of intergrades, let it stay; it is surely far better to run the risk of having too many variety names than attempt to consolidate them all under one by calling it species; but some may say who is to decide which is the species and which the variety.

I think Mr. W. H. Edwards has settled that question effectually,—they are all varieties, it takes the whole series to make up the species.

Priority may settle precedence. Adopt this principle, and it stops at once, and for all time the contention amongst the authorities whether theirs is the species or the variety.

We have the proof of experience, that no one form stands as the progenitor of all the others, but that each is quite capable of producing any one, or all of the rest. Now look at how this would affect the arrangement of our cabinets.

We should have *Caberodes confusaria* Hub., as the name of the species, not to be attached to any form, but including all, then we should have *confusaria var.* this, that and the others, as far as we had obtained material. Thus avoiding the use of three names on a label, which we all know is exceedingly inconvenient; giving us a clear and comprehensive view of a variable insect, and adding greatly to the interest, value, and scientific exactness of our collections. If this principle of dealing with varieties was adopted for all kinds, which Mr. Edwards applies only to seasonal ones, there would have to be a considerable addition made to the names on our lists. Take any species with varieties:—

Catocala relicta, for instance, has three well defined forms, each as truly *relicta*, as the others, two only have separate names, so we want yet another name to give naturalness to our view of the species *relicta*.

As to how we lose by our present method, which of us has any definite conception of *Drasteria erechtea* as a species; we are all familiar enough with bits of it. I see by Mr. Grote's list that it has been endowed with nine names in its time, and I doubt not they could be all occupied to advantage. If I could have got separate names for my different forms I should have collected all I could find, but varieties without names in a collection are a confusion and a nuisance; yet each one is needed to give a correct view of the species as it exists in nature, but our present method offers no inducement to follow it out, as they occupy no permanent place in our literature, whatever they may do in nature; yet it appears to me that the production of varieties, is one of the most intensely interesting operations that is going on in nature's vast laboratory, and well worthy of our closest observation and study.

Rev. C. J. S. Bethune submitted a circular letter from Prof. Alfred Wailly, of England, asking for specimens of any silk moths or their cocoons.

Mr. Fletcher drew attention to an article which had appeared in the August number of the *Canadian Horticulturist*, condemning the use of Paris green as an insecticide. He considered that article inaccurate and very injurious, as it might prevent the farmers from making use of this most valuable remedy, and in confirmation of his opinion read a letter from Prof. A. J. Cook describing experiments with Paris green, and proving that no ill effects could result from eating potatoes or fruit upon which it was used in the ordinary manner for the prevention of insect attacks.

Mr. Harrington submitted a note on "Further Observations on *Oryssus Sayi*," in which attention was also drawn to a clerical error in the paper on that insect in the May number of the *Entomologist*.

A vote of thanks was unanimously ordered to be conveyed to the Mayor and City Council for the use of the council chamber and committee room in the City Hall for the meetings of the Society.

The meeting adjourned at 6 p.m,, *sine die*.

ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Club met at New York on Tuesday, August 9th, 1887, at 2.30 p. m. The President, Professor Comstock, of Cornell University, Ithaca, took the chair, and Mr. J. B. Smith, of Washington, D.C., acted as Secretary, in the absence of Mr. E. Baynes Reed, of London, Ont.

Meetings were held from time to time during the session of the A. A. A. S. The following persons were present at some or all of the meetings of the Club :—Prof. J. H. Comstock, Ithaca, N.Y. ; J. A. Lintner, Albany, N.Y. ; Prof. C. V. Riley, J. B. Smith, Washington, D.C. ; E. L. Graef, Rev. G. D. Hulst, Brooklyn, N.Y. ; W. Beutenmüller, G. W. J. Angell, New York ; Mr. and Mrs. E. W. Claypole, Akron, O. ; Mr. and Mrs. H. F. Bassett, Waterbury, Conn. ; Prof. A. J. Cook, Agric. College, Mich. ; G. Dimmock, Cambridge, Mass. ; Dr. P. A. Hoy, Racine, Wis. ; J. H. Emerton, Boston, Mass. ; Rev. J. G. Morris, Baltimore, Ind. ; A. S. Fuller, Ridgewood, N.J. ; Mr. and Mrs. E. D. Southwick, F. B. Chittenden, E. C. M. Rand, Dr. Maury and others.

The Entomological Society of Ontario was represented by Prof. W. Saunders, of Ottawa.

The President read his annual address, giving a history of the various systems of classification of insects since the time of Linnæus, and especially dwelling upon the more recent subdivisions of some orders by Brauer and Packard. The address is to be printed in a new introductory work on Entomology. Prof. Riley, commenting upon the address, said that the paper was an important one, and he fully realized the difficulties in coming to a final and satisfactory conclusion. For his part he liked the old classifications, based on the trophi and pterostic characters ; they had the merit of being well defined and easily limited. He did not believe in the creation of numerous orders, but would rather consider them aberrant groups or sub-orders, if necessary. Classification, however, for some time to come must be a matter of opinion. Many classifications have been proposed since that of Linnæus, have had their day, and have been forgotten. He had the highest respect for Dr. Brauer, but he did not entirely agree with him. He did not think too much stress should be given to the adolescent states, which more than anything were subject to independent changes by their environment.

Mr. J. B. Smith said he was glad Prof. Comstock had chosen the subject he did, for he had long wished that the gist of Brauer's classification could be presented in an accessible form to American students, and Prof. Comstock's paper did that to some extent. He agreed thoroughly with Prof. Riley in his estimate of the value of the adolescent stages.

In the Lepidoptera for instance the larvæ of *Alypia*, *Psychomorpha* and *Eudryas* are scarcely distinguishable, while the imagoes certainly belong to different families. He thought it required considerable courage often, to carry out consistently the idea of giving value to structure, irrespective of number of species or genera. In the Coleoptera only they have consistently based families on structure, whether there was one species or thousands.

Under the call of papers, Mr. Smith read from printed proofs a paper on the species of *Callimorpha*, prepared for the U. S. Nat'l Mus. Proc., illustrated by blackboard sketches. He made nine species of the American forms instead three as heretofore recognized, and pointed out the differences between them, making the pattern of maculation the criterion of his species.

Mr. Graef expressed his dissent from Mr. Smith's views, and showed how in his opinion the maculation could be so modified as to produce the different forms.

Prof. Riley commenting on Mr. Smith's paper said that he did not agree with him at all. He thought that there was but a single white species and possibly there may be three rather well marked species, with three moderately well marked larval forms. He said that in variation not only colour changes but sometimes the pattern does also. Especially is this true in forms that have more than a single brood annually. He instanced cases in the *Tortricidæ*, where forms appear, so different in pattern that there seems no possible connection between them, but bred from the same hatch of eggs.

Mr. Hulst also expressed his dissent from Mr. Smith's views. He thought that the variability of other species in the *Arctiidæ* was well established by breeding, and it should be at least considered probable that other species in the same group varied as much. He had taken specimens numerously, and it seemed to him that he had taken forms from the lightest to the darkest under such circumstances as to make it very certain they were one species.

Mr. Smith replied briefly, admitting the possibility that the white forms may be albino forms of dark species, but again emphasizing the differences in pattern as indicative of specific value.*

On Wednesday, August 10th, the Club met at 9.20 a.m.

The following officers were elected for the ensuing year:—

President—Mr. John B. Smith, Washington, D.C.
Vice-President—Prof. J. A. Lintner, Albany, N.Y.
Secretary—Prof. A. J. Cook, Agricultural College, Mich.

Mr. Basset enquired whether anyone could tell him positively how many broods of the currant worm there are annually.

Prof. Cook said in Michigan there are two; Dr. Morris said two near Baltimore, Md.; Prof. Riley said probably three in the south, but this is uncertain, as the insect is rarely injurious there and attracts less attention; he believes there are three from information he has received, but there are only two broods in the north where it is injurious. Prof. Comstock said they have two broods at Ithaca, N.Y.

Mr. Bassett said that until recently he had believed the same, but last summer a friend brought him every few days eggs and larvæ in all stages throughout the season; he was very much surprised at this and thought it indicated more than two generations.

Prof. Riley replied that this was true; they did appear in that way, but that was caused merely by the difference in the time required for development, some running through their transformations much more rapidly than others. There are, however, only two well marked broods, which overlap each other or leave only a very short interval between them.

* For further discussion of this subject *vide* Mr. Lyman's paper in the *Can. Entomologist* for October, 1887, page 181, and Mr. Smith's paper *C. E.*, December, 1887, page 235.

Prof. Cook confirmed this statement. He had, in laboratory experiments, carried over the pupæ of the spring brood until the following summer, and in the same way the codling moth has been carried over.

In the afternoon the Entomologists and Botanists joined in an excursion by steamer to Sandy Hook, which proved very interesting and agreeable.

On Thursday, August 11th, the Club met again.

Prof. Saunders, of Ottawa, gave a brief review of what had been done recently in the way of establishing Experiment Stations in Canada, at which Entomology in its relations to Agriculture formed one of the subjects of experiment. Five stations are proposed—a central station at Ottawa, a 2nd in the Maritime Provinces, a 3rd in Manitoba, a 4th in the N. W. Territory and the 5th in British Columbia. At the Central Station an Entomologist—Mr. Fletcher—has been appointed, and a collection of insects of all the sections will be formed there. It is intended also that bulletins be issued several times in the course of the year to interest the public in the work and demonstrate its general utility. He had been travelling about a great deal during the past year and had done little Entomological work ; but he had noticed this spring near Ottawa the larva of *Vanessa antiopa* in immense numbers, stripping willows. It is not usually common with them. In Nova Scotia he saw *Satyrus alope* and *nephele* in great numbers, with all sorts of intergrades between. He also found the potato beetle there, which appears in this section for the first time. The growers there follow the old fashioned plan of knocking them into a pan with a stick.

Dr. Morris stated that *Crioceris asparagi* had reached them at Baltimore and proved very destructive. Prof. Saunders said it was not yet found in Canada. Prof. Comstock said he had found it as far west as Geneva, N.Y. The insect seems to have started from Long Island.

Prof. Cook said that the method of knocking the potato beetles from the plants with a stick, is both old and new, for one of the largest growers of potatoes in his section of the country had returned to it after trying all kinds of poisons. He claimed it was cheaper for him to destroy them in that way, and while Prof. Cook did not understand how this could be possible, yet this farmer claims it is so and follows out his belief.

Prof. Saunders said that in the Maritime Provinces, Nova Scotia and New Brunswick, he found the larch saw-fly (*Nematus erichsonii*), extremely abundant and destructive.

Mr. E. C. M. Rand, of New York exhibited some specimens of Coleoptera taken from a mummy, and suggested they might be of interest, as perhaps old types. The mummy dated back at least as far as 1200 B.C., and he explained the number of wrappers and method of covering, and stated that channels had been made in the wrappers, and in these some of the bettles were found.

Prof. Claypole explained the use of gasoline for collecting purposes. (See his paper : "A Practical note on Collecting Insects.") He also exhibited an insect case used by him, which he claims to be superior to any equally cheap contrivance. It consists of a box frame into which a glass top is permanently fixed ; the bottom is corked, or not, as desired; it is filled with specimens and then screwed to the frame.

Prof. Cook said that he had tried gasoline, and found it much less rapid and certain than cyanide properly prepared ; he did not believe in it at all.

Mr. J. B. Smith objected to Prof. Claypole's case that it was too inconvenient to use, as to get at an insect meant unscrewing the bottom and replacing it. A collection so preserved was useless except for the most superficial comparisons.

Prof. Comstock explained a contrivance for watching the early stages of Hymenoptera nesting in stems of plants. He took a number of slender glass tubes, covered them on the outside with dark paper, and hung them on bushes frequented by such bees. He exhibited several of these tubes in which the bees had nested, containing larvæ in various stages of developement. The whole life history can thus be watched with very little trouble.

Mr. J. B. Smith read a paper on "The Specific characters of the genus *Arctia*." (Published in full in *Entom. Amer.* vol 3, p. 109.)

The date of the first meeting for next year was then discussed, experience having shown that the first meeting of the Club, as now held on the day preceding the general meeting of the Association, was generally poorly attended and the President's address read to almost empty benches. After some discussion it was resolved to hold the first meeting of the Club in future at 9 a.m., on the first day of the meeting of the A.A.A.S.

On *Friday, August 12th*, Prof. Riley gave a short account of the discovery of the female of *Phengodes*. He also spoke on *Pronuba*, and its connection with the pollination of the Yucca; and on a new species of *Lecanium* found on the Austrian pine in Wisconsin. The asparagus bettle (*Crioceris asparagi*), he finds is extending south, having been observed in Fairfax County, Virginia. During the present year there has been a most remarkable swarming of the butterfly *Apatura celtis* in the Southern States. These migrations generally take place in the autumn, but this was in the Spring. The only way of accounting for it is that the conditions were unusually favourable for their hibernation and development.

Dr. Lintner spoke of the alarming increase of the Larch Saw-Fly. (*Nematus erichsonii*). He gave a history of the dates and places at which it had been heretofore observed, and the injury it had done.

On July 7th it was reported to him from St. Lawrence Co., N. Y. where it appeared on three Tamaracks growing in a door-yard. About 10th July they appeared in countless hosts completely covering the trees so that the end of a finger could not be placed on a branch of one of them without touching one or more of the worms. They also covered apple and maple trees and shrubbery, but ate nothing but Tamarack.

About the same time examples of the larva were received from Otsego Co., taken from the European Larch. The pupæ were found after July 12th under moss some little distance from the trees. It has done considerable damage also in Hamilton County in the Adirondack region. Every Tamarack for miles around was entirely stripped, and looked as though the fire had been through it. Dr. Packard says the attack is not fatal to the trees, and near Lake Pleasant early in August he observed the Tamaracks putting out new buds. The larvæ were attacked by a *Podisus* allied to *modestus*, and the pupæ were eaten by ants. In Europe the species seemed to be kept in check pretty well by its parasites, and it has never been destructive there.

Prof. Riley said we can hardly hope with Dr. Packard that the attack will not be fatal to the trees. When he went over the ground in Maine with Dr. Packard this spring, many trees were already dead.

In the evening a very pleasant party met at Mr. Graef's residence in Brooklyn where the evening was spent in examining Mr. Graef's collection and discussing the merits of the collation provided.

On Monday, 15th, Mr Emerton read a paper by Prof. L. M. Underwood, on "The Literature of the North American Spiders," reviewing the work thus far done in the *Arachnidæ*.

Mr. Smith made some remarks on the paper mentioning the work being done by students of the group and that the U. S. National Museum was accumulating a very fair collection in the class. He also defended the practice of describing species as justifiable under some circumstances in stimulating or exciting interest, and claims that nothing is so discouraging to beginners as a lot of material which is unnamed and unnameable until some one monographs the whole.

Mr. Emerton said that he intended to continue his work on the New England spiders, and will keep his types, at least until the work is all done. He was opposed to hasty descriptions, and to hasty identifications of old species where there is nothing to

identify them by. He preferred to give a new name to an insect rather than to identify it with an old name, unless he was quite sure of his identification.

Dr. Hoy spoke of the peculiarities of the Lepidopterous fauna, of Racine, Wis., describing the location of the place, and enumerating some of the Southern butterflies and moths that have been taken there,—among them *Terias Mexicana*, *Apatura celtis*, *Argus labruscae*, *Dilophonota ello*, and *Erebus Zenobia*.

On Tuesday, 16th, Dr. Lintner spoke on the larva of *Haltica Alleni*, Harris, now known as *H. bimarginata* Say, which he found in great numbers near Lake Pleasant, skeletonizing Alder. He exhibited specimens of the larvæ and pupæ. The latter are found naked in moss. It was yellow when found, not white as described by Dr. Packard.

Mr. Angell stated that he had recently, for the first time, heard *Polyphylla* stridulate. Mr. Dimmock said that *Cerixa* sometimes makes quite a loud stridulating noise.

Some general remarks and questions concerning captures at Sandy Hook followed, and the Club finally adjourned to meet again at 9 a.m., on the first day of next year's meeting of the A. A. A. S.

[For the above account we are much indebted to Mr. J. B. Smith's Report in *Entomologica Americana* for September and October, 1887].

ADDENDUM TO THE PAPER ON THE COTTON MOTH IN CANADA.

(*Page 18.*)

BY THE REV. C. J. S. BETHUNE, PORT HOPE.

The information brought out during the discussion of my paper on the Cotton Moth —read at the annual meeting of the Entomological Society at Ottawa—has led me to entirely change my views as expressed therein regarding the migration of this insect from the south to the north. I am now convinced that the moth does come to us from the cotton fields of the south, and is not a native of this country, for the following reasons:—

1. The simultaneous appearance of the moths in vast numbers at Hamilton, Port Hope, and Ottawa can only be accounted for by the migration theory.

2. There are not enough plants in the whole of Canada of the order *Malvaceæ* to provide sustenance for the larvæ of the moths seen at the above three places alone.

3. The few common plants of this order have not been observed by our entomologists to be attacked by any insect whatever.

4. No specimens of the larvæ of the cotton moth have ever been found in this Province upon the basswood—the only probable alternative food-plant.

5. The prevailing winds during the week previous to the arrival of the moth were quite favourable to its flight from the south-west.

6. The appearance of the moth in Canada during the many years of its occurrence has always been in the autumn, at the end of September or the beginning of October. At this time of year the cotton fields are pretty well denuded of foliage, and the moth, finding no suitable places for depositing its eggs, flies off to distant localities.

Since the meeting of our Society in October, I have endeavored by correspondence to trace the flight of the moth, but though my friends have been very kind in replying to my enquiries, I have not been very successful. I wrote to one entomologist in each

of the following places along the route by which the moth must have most probably come to us. but in nearly every instance the insect was not observed, and did not, at all events, appear in any remarkable numbers :—

Rochester, N. Y.—No observation.

Buffalo, N. Y.—No reply.

Ithaca, N. Y.—No observation.

Akron, Ohio—Professor Claypole writes, "I have not seen the cotton moth here this year. Since the beginning of September I have had twenty-eight students, more or less eagerly in pursuit of Lepidoptera, but I did not see this insect in their collections."

Dayton, Ohio—Mr. G. R. Pilate writes, "I have not noticed *Aletia argillacea* this year; but two years ago, late in the fall, thousands of them were seen around the electric lights for a number of days. I do not agree with Mr. Grote that they *all* come from the south. When I lived in the centre of this city, some five or six years ago, I took a specimen that had just emerged from a pupa in my garden ; the wings were still soft, and when placed in a glass, it emitted the red fluid that all freshly emerged Lepidoptera do."

Lafayette, Ind.—Not observed.

Champaign, Illinois—Professor Forbes, Director of the State Laboratory of Natural History, writes, "The assistant who has had special charge of the electric light collections this season tells me that he visited the light several times on favourable nights in September and October, but took no Aletias. We did not 'sugar,' however, but I think it unlikely that any extensive migration should have occurred here without our notice."

Carbondale, Illinois.—Mr. G. H. French, Professor of Natural History in the Normal University of Southern Illinois, writes that he has been too much occupied with other matters to make any observations during the past season, but in a collection sent him from Galesburg, in the northern part of the State, he found a specimen of *Aletia argillacea*, dated October.

Coalburgh, West Virginia.—No observation.

Allegheny, Pennsylvania.—No observation. Dr. Hamilton writes that "the locality would be difficult to reach by a moth coming from the cotton regions, as from three to five hundred miles of rugged, uncultivated, mountainous country would intervene. The Alleghany Mountains, commencing in New York, are north and east, and circle round south through Maryland, and westwardly through Virginia, West Virginia, and half through Tennessee, thus shutting off all communication from the south."

In consequence of the geographical features referred to by Dr. Hamilton, I took it for granted that the moth must have come to us from the south-west, and accordingly made my enquiries from friends along its probable route. It is very remarkable that the swarm that visited this Province should not have been seen at any of the places mentioned above.

In order to further determine the probable route of our swarm of cotton moths, I obtained from the Observatory at Toronto, through the kindness of Mr. Carpmael, the Superintendent of the Meteorological Service, a full abstract of the direction and velocity of the winds for each hour during the first nine days of October—a period sufficient to cover the time occupied by the flight of the insects. The observations were, of course, made at Toronto, but they are applicable to Port Hope and Hamilton, and all this portion of the Province of Ontario.

On October 1st, the winds were south-west, and very light, averaging $3\frac{1}{2}$ miles an hour, till 6 o'clock a.m. ; south, with increasing velocity up to 16 miles an hour, till noon ; then south-west, and gradually dying away till midnight. Average direction for the day, south, 27° west ; mean velocity, 6.21 ; resultant velocity, 5.84.

October 2nd, south-east till 8 a.m., and very light ; from 9 a.m. to 1 p.m. changing from west to north, north-west and back to south-east, rising to 9 miles an hour ; during

the remainder of the day south and south-east, with diminishing force at night. Average direction S. 24° east; mean velocity, 4.12; resultant velocity, 2.44.

October 3rd.—Changing from south to east shortly after midnight, and blowing more strongly from the east, up to 12 miles an hour till 7 a.m.; during the remainder of the day blowing strongly, up to 26 miles an hour, from the south-west, shifting at times to the west. Average direction, S. 43 W.; mean velocity, 16.21; resultant velocity, 11.66.

October 4th.—Strong south-west winds (up to 17½ miles an hour) till 10 a.m.; then blowing harder still, up to 25 miles an hour, from the west, shifting to north-west in the afternoon, and diminishing considerably in force at night (6 miles per hour at 11 p.m.) Average direction S. 85 W.; mean velocity, 15.58; resultant velocity 13.33.

October 5th.—North-west winds all day till 7 p.m., when it changed to the west. Average direction N. 54 W.; mean velocity 10.38, resultant velocity 9.89.

October 6th.—The west wind continued till 3 a.m., then changed to south-west, and at 9 o'clock to south; in the afternoon south-east, changing to south and south-west at night, and to west before midnight. Average direction S. 19 W.; mean velocity 6.56, resultant velocity 5.55. The winds were highest from 11 a.m. to 3 p.m., and very moderate at night.

October 7th.—(The day on which the moths were first observed here.) Very gentle winds west to north-west, varying to north up to noon; then shifting to north-east and east. A fine, mild day. Average direction N. 10 W.; mean velocity 2.85; resultant velocity 1.09.

October 8th.—Winds very light, north-east to east up to noon, then south-east and south till 9 p.m., when they changed to the south-west. Average direction N. 52 E.; mean velocity 4.79; resultant velocity 3.10. On this day, and the preceding, the moths were found in the lake and washed up on the shore. The southerly winds of the 6th may have helped the swarm in their flight across the lake, and then the change to northerly and cooler winds may have checked their flight and caused them to drop into the water.

October 9th.—Winds gentle, south-east, south and south-west. A very mild day, with a little fine rain at night. Average direction of the wind, S. 18 W.; mean velocity 4.50; resultant velocity 4.14.

Mr. Carpmael also very kindly sent me a table of the direction and velocity of the wind at Kingston during the same period taken at the usual hours of observation, viz., 7. a.m., 3 p.m., 10 p.m. This will assist us as regards the appearance of the moth at Ottawa:—October 1st, winds south-west, mean velocity about 7 miles. Oct. 2nd, south in morning, south-west in afternoon and evening; mean velocity 2 miles. Oct. 3rd, east in morning, south-west afternoon and evening; mean velocity 9 miles. Oct 4th. south-west in forenoon, south in afternoon, north-east at night; mean velocity 9 miles. Oct. 5th, north in the morning, north-west in afternoon, west at night; mean velocity about 4 miles. Oct. 6, west in morning, south-west in afternoon and evening; mean velocity about 5 miles. Oct. 7th, west in morning, south-west in afternoon, and north-east at night; mean velocity about 4 miles. Oct. 8th, north-east at each observation; mean velocity 5 miles. Oct. 9th, north-east in morning, south-west in afternoon and evening; mean velocity 3 miles.

From the above we gather that the direction of the wind was very much the same at Kingston as at Toronto, but the velocity was considerably less at the former station.

In addition to the foregoing, I have obtained through Dr. Hamilton a table of similar observations made at Pittsburg, Pennsylvania, by the Signal Service Observer of the U. S. army. This will give us some idea of the prevailing winds to the south of us, and by comparison with the observations at Toronto and Kingston, will help us in the formation of some conclusion regarding the migration of the cotton moth.

The Pittsburgh observations were taken at the same hours as those at Kingston, and are, briefly, as follows:—Oct. 1st, winds south-west throughout the day; mean velocity.

about 6 miles. Oct. 2nd, south-west in morning, west in afternoon, south in evening; mean velocity about 7 miles. Oct. 3rd, west morning and afternoon, north-west at night; mean velocity 15 miles. Oct. 4th, west throughout the day; mean velocity 10 miles. Oct. 5th, north-west throughout the day; mean velocity 9 miles. Oct. 6th, south-west morning and afternoon, south at night; mean velocity 10 miles. Oct. 7th, east in the morning, south in afternoon, north at night; mean velocity 4 miles. Oct. 8th, north morning and afternoon, west at night; mean velocity 2 miles. Oct. 9th, north in morning, west during remainder of the day; mean velocity about 5 miles.

From the foregoing meteorological observations we may certainly gather that there was nothing in either the direction or force of the prevailing winds during the first week of October to prevent the cotton moth from flying to Canada from the southern cotton fields, which lie almost entirely to the south-west of us. In the next place, we may conclude that the winds during the first few days of October, though light, were such as would help the flight of the moth in this direction. For the first four days they were nearly always south-west or west, and on the 3rd, when they were at their highest velocity in Toronto, they were south-west. On the whole the meteorological conditions were, I consider, distinctly favourable to the migration of the insect from the southern States to Ontario; the weather was warm, free from frost at night, no heavy showers of rain, a moist atmosphere, and winds for the most part in a direction to aid the flight thitherward.

In conclusion, I must confess myself to have changed from a strenuous supporter of the indigenous theory to an equally firm believer in the opinion upheld by Prof. Riley and Mr. Grote, that the moth may occasionally breed for a season in the north, but that its home is in the south, and that the specimens we observe here have flown to us over wide tracts of country from the cotton fields far away to the south-west.

I trust that in future seasons, further observations may be made, and that in time we may be able to trace the route by which this interesting immigrant so frequently travels to our land.

POPULAR PAPERS ON ENTOMOLOGY.

THE OAK-PRUNER: ELAPHIDION VILLOSUM, Fabr.

BY FREDERICK CLARKSON, NEW YORK.

In support of the records relating to the periods of transformation of this beetle, and the probable cause of their pruning the branches of the Oak, which I had the pleasure to contribute to the Report for 1885, I now add some further facts, resulting from a recent visit to Clermont, N. Y.

On the 29th of October, I gathered from under a group of *Quercus tinctoria* seven branches that had been pruned by this longicorn. The tunnels were from ten to fifteen inches long, in branches from one-half to three-quarters of an inch in thickness. The branches I carefully divided lengthwise, so that the parts could be replaced in position. Six of them contained the pupa, one the larva, which pupated November 4th. One of the pupæ I preserved as a specimen. The imagoes appeared on the following days: Nov. 14th, 22nd, 26th, 29th, Dec. 9th and 25th, all females.

These transformations were rather hindered than advantaged by meteorological conditions, for they occurred in a room having a northern exposure, in which, during the period of the transformations, the thermometrical record differed but little from that in the shade without. Had the branches remained upon the ground, the included insect would have received all the benefits resulting from the direct rays of our Indian summer's sun, as well as the moisture from the ground; influences that ordinarily assist development. As the imagoes appeared they were examined and replaced in their tunnels, where they now remain in a passive state, and are not likely, I think, to exhibit their natural activity until next May or June.

The object of the paper referred to, as well as this article, is to present facts that seemingly disprove certain theories relating to the habits and metamorphoses of this beetle, which have been formulated by distinguished sires and accepted by their credulous sons. What Drs. Peck, Fitch, and Harris have written upon this subject has been substantially repeated by almost every entomologist who has undertaken a history of this beetle. We are very apt to fall into line when we have an abiding confidence in a leader. While I am unwilling to deny the conclusions of these naturalists, I yet think that the facts related go to show that the insect matures at a period earlier than that named by them, and that the benefits supposed to result from a dismemberment of the branch, in so far as the changed environment is concerned, are wholly unnecessary to the development of the included insect, and that there is a plausibility in the inference, if not a certainty as to fact, that the object of pruning the branch is to prevent the flow of sap. If the habits of this beetle as given by these doctors are to be regarded as *ipso facto*, then we must admit the possession of a faculty in these lower organisms that towers above instinct and presents the feature of intelligent reason. This is a subject that cannot very well be discussed in these pages, yet it may not be out of place to say that able writers on the question very generally admit that the habits of insects follow a prescribed law, by some regarded, in a materialistic sense, as mechanical; and by others, spiritually considered, as in furtherance of a divine edict. This latter view is very cleverly presented by St. George Mivart, in Organic Nature's Riddle: "Our experience," he writes, "is in favour of the existence of an intelligence which can implant in and elicit from unconscious bodies activities that are intelligent in appearance and result . . . . 'Unconsciously intelligent action,' improperly called 'intelligent,' is that which is called intelligent only as to its results and not in the innermost principle of the creatures which perform

such actions." "Instinct," Todd says in his Cyclopædia of Anatomy and Physiology, "is a special internal impulse urging animals to the performance of certain actions which are useful to them or to their kind, but the uses of which they do not themselves perceive, and their performance of which is a necessary consequence of their being placed in certain circumstances."

If such definitions are accepted, how are they to be reconciled with the marvellous statement as given by Dr. Fitch? That the larva should prune the branch to prevent the flow of sap would be a necessary consequence of its being placed in certain circumstances, but to do so that the branch may fall to the ground presents a course of reasoning that relates to a condition foreign to the then existing environment. The habits of this beetle from the period of egg-hatching, as given by Dr. Fitch, displaying as it did to him extraordinary intelligence, impress me as presenting the most natural instinctive qualities. The ova, he says, is deposited on a small green twig, the soft, pulpy tissues of which nourish the infant larva, which, when increased in size and strength, attacks the hard wood of the branch, transversely, in a circular direction, consuming it all, leaving the branch supported only by the bark. From these premises, without pursuing the subject further, it is evident that the infant larva requires sap-wood for its sustenance, which it derives from the twig, but so soon as its strength permits, it seeks for dead-wood by attacking the branch, which is found more and more free from sap as the work of severance progresses. The aim therefore from the start is to obtain the dead-wood, and when the branch is eaten through the larva continues its feeding in forming a tunnel through that portion of the branch which is cut off from the supply of sap.

The instinct of insects is wonderful enough, and more accurate perhaps than a mental process, but while we justly ascribe to them all the attributes pertaining to their natural gift, we are not warranted in imputing to them an intelligence only to be arrived at through a course of reason.

THE OAK PRUNER: ELAPHIDION VILLOSUM, Fabr.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

The account of this insect given by the early fathers of Œconomic Entomology is so charming that it seems almost profane to disturb a history accepted by most of their credulous offspring with unquestioning faith. Its wonderful habits and supra-rational instincts have been stock in trade ever since, and, like the fiction of the fly walking on glass by a sucker arrangement of its feet, is likely to hold its place in paste and scissor literature for all time to come.

Divested of all romance and imagination, and descending to facts, the observations of Professor Peck, Fitch and Harris may be reduced to this. In the month of July the parent lays the eggs on the limbs, or in the axil of a leaf near the end of the twigs of that year's growth of various species of oak, and perhaps other trees. After hatching, the young larva (in the latter case) penetrates to the pith and devours it downwards till the woody base is reached, and so onward to the centre of the main limb; here it eats away a considerable portion of the inside of the limb, and then plugging the end of the burrow, which it excavates towards the distal end, eventually falls to the ground with the limb, which being weakened, is broken off by the high autumnal winds. They exist here either as larvæ or pupæ till spring, and emerge in June as perfect beetles. Time, one year, though not so stated in words.

The account given in detail below is so different from the above, that were the identity of the individuals not established by actual comparison and by recognized authority, it might well be asserted I had given an account of some other *Elaphidion*.

April, 1883, I procured a barrel of hickory limbs from a tree girdled early in 1882; the limbs were from one-half to one inch in diameter. Very few things developed from them that season; but the next (1884) quite a number of species came forth—*Clytanthus*

ruricola and *albofasciatus*, *Neoclytus luscus* and *erythrocephalus*, *Stenosphenus notatus*, etc. Many larvæ of some Cerambycide continued to work on under the bark; late in the fall I observed that most of these had penetrated the wood, but some remained under the bark till April and May of the next year (1885). The most of the beetles appeared during the first two weeks of June, though individuals occurred occasionally till September. A few larvæ were still found at work, but by October they, likewise, had bored into the wood and appeared as beetles the next June (1886). The normal period of metamorphosis is therefore three years, but in individuals it may be retarded to four or more years.

At the present writing (June 5th) these beetles are issuing in great numbers from a barrel of hickory limbs obtained in April, 1885, from a tree deadened in January, 1884, thus verifying the first observation.

How the larvæ get under the bark could not be ascertained. When first examined, in April, they were from 4 to 5 m.m. long; they ate the wood under the bark, following its grain, and packed their burrow solidly with their dust. The growth and progress were both slow, for by the next April they had scarcely more than doubled in length, and had not travelled more than from four to six inches during the year; but after July they developed an enormous appetite, and consumed the wood for at least an inch in length, and often entirely around the limb, ejecting their castings through holes made in the bark. When full fed they bore obliquely an oval hole into the wood, penetrating it from four to ten inches. The larva then packs the opening with fine castings and enlarges a couple of inches of the interior of the burrow by gnawing off its sides a quantity of coarse fibre, in which it lies, after turning its head to the entrance. When about to become a pupa (I witnessed the process), the skin ruptures on the dorsum of three or four segments next the head; the head of the pupa appears, and after about half an hour's wriggling the whole body is divested of its covering. To the observer the pupa appears to crawl out of the skin, but in fact the skin with the large mandibles is forced backwards by the alternate extension and contraction of the segments, assisted materially by the fibre that surrounds it. After its soft body hardens, the same movements free it from the fibre, some being shoved in advance of the head, and some posteriorly, the exuviæ being often found at the distal end of the hole.

The time spent in the pupal state is indefinite, and does not seem to concern greatly the time of the appearance of the beetle. Sticks split open at different periods from December till March contained larvæ and pupæ about equally, but no developed beetles. A larva that I observed to go into the wood in April appeared as a beetle among the first of such as had presumably pupated in the fall.

The number of these beetles obtained that and the present season was great, and afforded a good opportunity to observe individual variations, and they do differ greatly. In length from 8 to 18 m.m.; in pubescence, some being nearly naked and unicoloured, others having it longer and condensed into spots or almost vittate; some being quite slender and elongate, while others are short and broad; the surface of the elytra is mostly uniform, but in some, especially such as are narrow and elongated, one or two costæ are more or less evident.

Now, although this account differs so widely from that given by Mr. Fitch, still the beetles are the same. Unfortunately, I have never been able to find any pruned oak limbs from which to obtain the insect myself, but I have a good set from Mr. Blanchard, of Mass., presumably from the oak, which are identical. Through the kindness of Mr. F. Clarkson, I have a set of those described by him in the *Can. Ent.*, vol. 17, p. 188, from oak limbs, and which became imagoes in November, and there is no perceptible difference. Dr. Geo. H. Horn says, "They are the same."

To identify *Elaphidion parallelum* had always been a puzzle to me, and I once thought I had a real set; I obtained it about a dozen times by exchange, but could never be satisfied that the specimens received were not pauperized, or peculiar individuals of *E. villosum*. On comparing my hickory insects with all the descriptions of *E. villosum* and *parallelum* and their several synonyms, as far as I possess them, it was easy to pick out sets that would answer satisfactorily all their requirements, and I became satisfied that *E. parallelum* could not be separated.

An inquiry of Dr. Geo. H. Horn elicits the following note and kind permission to use it :—

"Regarding the two species of *Elaphidion* (*villosum* and *parallelum*) of which you write, I can only say that my opinion, based on the series in my cabinet and an examination of those in the cabinet of Dr. Leconte, is that they are inseparable. The slight differences, referred to by Dr. Leconte, in the last ventral segment of the males, are not real but dependent on the angle at which they are seen." The differences referred to are that in *E. villosum* the last ventral segment of the male is rounded, while in *parallelum* it is emarginate. The only other structural difference mentioned by Dr. Leconte is,

"Prothorax scarcely longer than wide—*villosum*.

"Prothorax distinctly longer than wide—*parallelum*."

From the insects before me from the hickory, it is easy to pick out some with the thorax fully one-fourth wider than long, and others with it one-fourth longer than wide, but they are brought together so insensibly by intermediates, that where the proper separation into species should begin it is impossible to decide. The same may be said of the differences in elongation, narrowness, and pubescence; and I can find no basis for retaining *parallelum* as even a racial or varietal name.

I trust the foregoing may stimulate such as have opportunity to investigate the habits of this interesting beetle more thoroughly. I mention some of the points that require clearing up. First, the length of time occupied in the metamorphosis of such as breed in the branches of living trees. One year is certainly an error, as it is opposed to the known history of any other Cerambycide having a similar habit. Second, whether the falling of the limb is not accidental, the majority containing larvæ not being weakened enough to break. Third, whether the end of the limb remaining on the tree does not contain the insect equally with that which falls—points that might be determined by cutting down a tree in autumn from which limbs had been pruned. Fourth, to make a collection for comparison from each species of tree infested.

Besides the accounts of Professors Peck, Fitch, and Harris, the following bibliography may be noticed :—

Haldeman—Trans. Am. Phil. Soc., vol. 10, p. 34.

Larva feeds on the living [?] wood of oak, hickory, and chestnut; also, dead Abies.

Riley—American Ent., vol. 2, p. 60; *ib.* vol. 3, p. 239.

Larva bores in plum and apple twigs, and in dry grape cane, Missouri Rep., 3, p. 6. Bores into and prunes the limbs of the apple. *Ib.* 4, p. 54. Bred abundantly from injured grape stems.

Rathvon—U. S. Agricultural Rep., 1861, p. 615.

Merely a synopsis of Fitch's account.

Packard, jr.—Bul., No. 7, p. 30. U. S. Entomological Commission.

Scissored from Fitch in full.

Clarkson—Can. Ent., vol. 17, p. 188, and vol. 19, p. 31.

Discovers that the insect completes its metamorphosis in the fall and early winter, in oak limbs, and takes issue with Peck, Fitch, and Harris on several points.

Townsend, Can. Ent., vol. 18, p. 12.

Thinks Mr. Clarkson's discovery the exception, and not the rule, in the time of metamorphosis.

THORN AND WILLOW BORERS: SAPERDA FAYI AND S. CONCOLOR.

BY JOHN HAMILTON, M.D., ALLEGHENY, PA.

SAPERDA FAYI, Bland.—This beautiful Saperda breeds in the small limbs of Crataegus, especially *crus-galli* and *tomentosa*, as first observed by Mr. C. D. Zimmermann, *Can. Ent.*, 10, 220; and should it, like some of its allies, acquire a taste for cultivated fruit trees, it would be a formidable enemy, as is evidenced by the way it depredates on thorn bushes. The beetles appear here the last week in May or the first week in June, according to the season, the males preceding the females three or four days. They do not appear to eat, and are short lived, the whole brood (except stragglers) appearing and disappearing within the space of ten or twelve days, so that should the collector be negligent, or the weather unsuitable for collecting at the time of their appearance, he may get none till the next season. As soon as the females appear the males are ready to associate with them, the union lasting three or four hours. They are not much given to flying about, usually ovipositing on the same tree they inhabited as larvæ. There may be several thorn trees not far apart, and one will be depredated on year after year till it is nearly destroyed, while the others will remain untouched till colonized apparently by accident. The beetles are sluggish, and when approached suddenly fall to the ground and quickly endeavour to conceal themselves, not feigning death, as many insects under the same circumstances do; and when I say feigning death, I mean it literally, in opposition to an unsupported dogmatic statement which I lately saw in print somewhere, "that insects can have no knowledge of death."

Oviposition is effected probably during the night, and the process has not been witnessed nor the eggs seen. The limbs selected for this purpose vary from one-third to one and one-fourth inches in diameter, and according to the thickness of the limb, the female with her powerful mandibles makes from three to six longitudinal incisions through the bark, each about three-fourths of an inch long and equi-distant and parallel to one another, dividing the circumference into sections nearly equal; an egg is placed in each end of each of these slits, and as soon as hatched the larva makes a burrow beneath the outer layer of wood, perhaps one-eighth inch in length at first, and uses this as a retreat whence it issues to feed on the diseased wood caused by the incision. These slits and the irritation produced by so many larvæ at work, cause an increased flow of sap to the part, and a consequent thickening of the sections between the slits, so that the injured part soon assumes a gall-like appearance. On the approach of winter, the larvæ having now attained the length of .25 inch, retire back a little further and close the opening of their burrows with borings. One of the larvæ, however, and in thick limbs two or three at each end bore obliquely till one of them reaches the centre of the limb, up which it proceeds, often two or three inches; the others parallel this, but keep a wooden partition between the burrows. These larvæ are much larger—often twice the size—of those inhabiting the outer wood, and are the only ones that produce beetles.

The whole of the interior of the limb is now dead wood enclosed by a growth of living but unsound woody tissue, through which some openings remain. The limbs are much weakened at these places, and many of them, like the oak on which *Elaphidion villosum* depredates, would be broken off by the winter storms were the fibre not very tough and the trees very low. And here analogy leads to the conclusion that as the larvæ inhabit the portion of the limb next the tree, equally with that beyond the injured part, this is likely to be the case in the history of the Elaphidion mentioned.

Many of the larvæ in the outside wood perish during the winter, and the survivors, after feeding a while in the spring, likewise die, their mission seeming to have been merely to insure a sufficiency of dead wood to sustain the life of the favoured few destined for full development.

In the spring the larvæ in the deep wood return and feed on the dead wood, which is now abundant enough for all their wants, and by autumn they are nearly full grown

they again retire for the winter, and in the spring, after opening up communication with the outside world, feed for a short time, and when full grown measure in length about three-fourths of an inch. The larvæ now return to their burrows for final transformation. Some of them bore for at least six inches, while others scarcely go from the entrance more than twice their own lengths; the outer ends are closely packed with borings without and soft fibre within, which also fills the inner ends. The head of the larva may be either toward or away from the opening—seemingly a matter of indifference; in the former case the beetle emerges from the place of entrance, in the latter from a round hole at right angles to the burrow, probably cut by the beetle itself, as no such hole has been detected in the many limbs I have examined containing pupæ with their heads turned from the opening. Pupation occurs after the middle of April, and the perfected beetle will be found in the limbs about the first of May, though few of them emerge till the time stated at the beginning of this paper.

The above is the result of three years' careful observation of the habits of this beetle, and imperfect as the history is, the amount of time and labor expended in developing it can only be understood by those who have attempted similar things. How widely this beetle is distributed is uncertain, as till recently its habitat was unknown. The typical insects were taken in Ohio; it is in Mr. Reinecke's Buffalo Catalogue, and occurs at Hamilton, Ontario (Moffat). Any one can readily ascertain whether it occurs in his fauna by examining the limbs of the Crataegus for the unmistakable swellings it occasions.

Saperda concolor Lec. appears about the same time as *S. Fayi*, and like it, is short lived, few individuals occurring after the middle of June. Its larvæ infest the canes of a small willow growing along watercourses and in swampy places—*Salix longifolia*. The smaller canes are usually selected for breeding purposes, these varying from one-fourth to three-fourth inches in diameter. The beetle makes a longitudinal incision through the bark with her jaws about three-fourths of an inch in length, and in each end deposits an egg. Usually several incisions are made in the same cane some distance apart, which often cause its death the following year. The young larvæ follow the same course as those of *S. Fayi*, only they burrow deeper into the wood, and there are no supernumeraries, as there is no need for them, the wood of the willow dying much more quickly than that of Crataegus, and a warty, gnarly swelling occurring around each incisure.

The beetle, however, does not always select the smaller canes, sometimes choosing ones from one and one-half to two inches thick, in which case the larvæ pursue a different course, for instead of boring up and down, they take a transverse direction and girdle the stem one-third to one-half its circumference, causing a rough, annular swelling and frequently the death of the cane. Two years is the time usually required to complete the transformation, but some individuals probably pass through all the stages in a single year. The head of the pupa is toward the opening, from which the perfect insect emerges. The willow named seems to be the natural food tree of the larvæ of *S. concolor*, and, did it confine itself to this insignificant shrub, could scarcely be classed with injurious insects; but it appears to have likewise either a natural or an acquired taste for poplar, and might become very destructive, a fact first brought to notice in Bul. No. 7, 118, U. S. Ent. Com., where the compiler writes: "Girdling the trunks of sapling poplars, by carrying a mine around the trunk, which causes a swelling often nearly twice the diameter of the tree. We have found numerous saplings of the common poplar in the woods about Providence with the unsightly swellings around the trunk." In case this taste is perpetuated, this beetle will no doubt prove a formidable enemy to this species of shade or forest tree. But in what State this Providence is, or what kind of a tree "common poplar" is, we are not informed. Here the common poplar is the *Liriodendron tulipifera*, but at that Providence it may be a tree of some other genus. This beetle seems to have an extended distribution, occurring in Texas, Michigan, Canada, and New York, as well as here.

NOTES ON THE LOCUSTIDÆ.

BY WM. T. DAVIS, STATEN ISLAND, N. Y.

Whether they fill the listener with a train of happy thoughts, as Gilbert White says, or whether they produce a sadness because the days of summer are nearly gone, as Dr. Harris asserts, the songs of crickets and other Orthoptera have, nevertheless, the merit of always being interesting. An insect that can sing—that has something to say—even though it be the same, night after night, enjoys a sort of individuality, and this long discussion of the Katydids and the quiet murmur of the tree crickets, constitute one of the chief charms of our summer evenings. But they do not always sing or stridulate quite alike, and sometimes, too, their shrilling apparatus is slightly deformed or injured, producing some curious sounds when in use.

I once heard a Katydid whose singing apparatus was out of order, and the sounds given forth contrasted strangely with those of a rival male in an adjoining tree. *Amblycorypha retinervis* produces two somewhat different songs, or perhaps more correctly, varies the same song in time or extent of utterance, so that unless the same individual is listened to for some time, the notes might be attributed to different species. This insect often lays its eggs on the honeysuckle, and I once observed a female on the 16th of Sept., ovipositing on a low tree by the roadside, gradually biting the bark into a ridge, along which the eggs were laid, tile fashion.

On Staten Island, the first Conocephalus that is heard in the garden is *ensiger*, and with *ik-ik-ik*, as if sharpening a saw, enlivens low bushes and particularly the corn patch. This insect seems to especially delight in perching near the top of a corn-stalk and there giving forth its rather impulsive song. I have often watched one crawl, with many a spiral turn, up the stem, fiddling all the while. My notes on its first heard stridulation show considerable uniformity, and the average date may be taken as July 15th.

Conocephalus dissimilis is more of a low grass and weed loving insect than *C. ensiger*, and also comes later in the season. I have found this insect stridulating when its head was gone, picked off perhaps by some vagrant chick. The brown coloured specimens are much more common in this species than in *ensiger*.

Conocephalus robustus resides for the most part mid the grass on sandy ground near the sea shore, though an occasional individual finds its way inland. Along the sea beach they stridulate in early afternoon, especially if slightly cloudy, and when approached they have a curious fashion of dropping to the ground. I have often found them, on such occasions, actually standing on their heads in the soft sand, leaning against the grass stems which grow so close together, without in any way holding on to them. Whether this position is intentional or not, I cannot say, but certain it is that when looked for from above they offer the smallest extent of their bodies to view and may thus escape many enemies.

I have found another Conocephalus on Staten Island, mid the cat-tails that grow on the salt meadows, and a specimen sent to Mr. Samuel H. Scudder was considered by that gentleman to be an undescribed species. This insect keeps very close to the ground, hiding well in the vegetation, and is not easily discovered. The sound produced when stridulating is very faint, not louder than that made by *Gryllus abbrinatus*, and I was much surprised to hear such a faint song come from so large an insect. I have, in consequence of this faint song, named it the "slightly musical" Conocephalus, *C. exiliscanorus*.

HINTS ON COLLECTING HYMENOPTERA.

BY W. HAGUE HARRINGTON, OTTAWA.

To have the specimens in a collection look well, and at the same time be in a condition such as to render their examination as easy as possible, it is necessary that they should be properly collected. The ordinary cyanide bottles prepared either with plaster of Paris, or sawdust which are used for Lepidoptera and Coleoptera, do not furnish good

specimens of Hymenoptera, and those collected in alcohol are less satisfactory. I have found the method advised by Dr. Williston (Psyche, vol. iv., p. 130) for collecting Diptera, so satisfactory that I will quote a portion of his description :—

"I select several two-ounce, wide-mouthed bottles of the same form, and carefully line the bottom and sides with a good quality of blotting paper. Good firm corks are selected, which are interchangeable in the different bottles; in one of these corks a small hole is made, in which it is better to fit a small metallic ferule; a strip of blotting paper is then coiled within this cavity, and it is over this that a few drops of a solution of cyanide of potash is poured."

For those who may not desire to keep on hand a solution of this poison, I would suggest a modification of this method which I find very satisfactory. Scrape a few grains of cyanide into the cavity in the cork and then insert a small wad of damp cotton wool or sponge. The fumes will be readily given off, and it is only necessary to occasionally renew the cyanide. As Dr. Williston suggests, it is well to have several bottles, but it is sometimes impossible for the collector to take more than the minimum amount of apparatus, and he will then limit himself to two, reserving one of them for delicate or small insects. Bees should never be placed in a bottle with previous captures, as honey is often disgorged, and the specimens greatly injured by the matting of pubescence and soiling of the wings; the pollen which the bees so generally carry is almost as bad in its effects. The safest and most desirable plan is for the collector to carry a supply of small pasteboard pill boxes, and transfer his specimens frequently to these, putting only one specimen of such insects as Bombus in a box. These boxes can be obtained of very small sizes, permitting a sufficient number to be packed in a small space. Their use ensures perfect specimens and enables the collector to keep a better record of them by numbering the boxes, and in his field note-book entering full particulars of the contents of each. When possible, it is better to pin the insects before they stiffen, but if time or circumstances do not permit of this, they will keep safely in the boxes, and may be at any time easily relaxed in a damp atmosphere, care being taken not to allow them to become wet. In pinning, it is not at all necessary to set the wings and feet symmetrically, unless one has plenty of time and desires pretty specimens. The wings, however, should be separated, so as to admit of a full examination of the venation both of the anterior and posterior ones, and of the metathorax and the basal segments of the abdomen.

USE OF CHLOROFORM IN COLLECTING.

BY J. A. JACKSON, DES MOINES, IOWA.

In the article of Henry S. Saunders, on Collecting at the Electric Light (*Can. Ent.*, Feb., 1887), he gives his experience in the use of cyanide of potassium and chloroform as follows: "Cyanide of potasium I found the best poison; a few drops of chloroform on cotton would quiet them more quickly, but was more troublesome, the chloroform having to be frequently renewed, occasionally as often as four or five times during the same evening, and sometimes even then the moths would be found alive the next morning."

I should like to explain my method of collecting with chloroform. I have found it better than any other, whether at the electric light or in the field :

Take a glass fruit jar, one in which the lid screws down upon a rubber cushion or packing. Put a bunch of cotton in the bottom, retaining it in its place by pressing down upon it a circular piece of pasteboard, made to fit tightly in the jar, except that two or three notches should be left in the edge for the chloroform to run through to the cotton. Saturate the cotton with chloroform and screw the lid down tight. The bottle is now ready for use, and it will be found that an insect dropped into it will be suffocated almost instantly by the fumes of chloroform that completely fill the bottle. A feeble flutter for a second, a kick or two, and all is over. As soon as the insect is dropped into the bottle, screw the lid down again, and as it fits air tight, the chloroform will not evaporate too rapidly. Less than a teaspoonful will last for a whole evening's work. If on retiring

from the work the chloroform seems nearly exhausted, it would be well to pour in a few drops more, and then close the lid for the night. If these precautions are taken the insects will never revive.

Chloroform, when used in this manner, will be found to possess many advantages over any other poison. It is quicker in its action, much more convenient, and under all circumstances entirely harmless. I use this form of collecting bottle both for the electric light and in the field. The bottle will contain, without injury to the specimens, the captures of a whole evening, or a whole day.

If, through carelessness, so much chloroform has been poured into the bottle as to saturate the pasteboard on which the specimens rest, their wings may become moistened and somewhat damaged. To prevent accidents of this character, pack a bunch of crumpled newspaper tightly down on the pasteboard before putting in any specimens; the paper will be dry, and will prevent the insects from coming in contact with the moist pasteboard.

For Coleoptera I use a morphine bottle prepared in the same way, except that the newspaper is not wanted, and it is closed with a cork. I always carry such a bottle in my pocket ready primed, and thus am always prepared for preserving any specimens captured incidentally while engaged in other affairs.

A PRACTICAL NOTE ON COLLECTING INSECTS.

BY PROF. E. W. CLAYPOLE, AKRON, OHIO.

In reference to the above two notes on collecting, will you allow me to make a few remarks? Entomology is with me a secondary subject, my time being for the most part occupied with another science. Perhaps this has led me to devise means for economizing time and labor more than I should otherwise have done; but the study of insects has great attraction for me, and I spend no little time upon it.

The method which I desire to mention may be too well known to deserve any space in your columns—if so, I can only ask you to overlook my intrusion—but I have never seen it mentioned in print anywhere, nor have I ever seen it used by any entomologist of my acquaintance. Perhaps also there may be some objections to its adoption which I have not discovered in the course of several years' use. In that case I shall be glad to learn them.

Your contributors speak of chloroform and cyanide of potassium as their favourite insecticide materials. Both these I have abandoned for some years, the former because it is expensive, and the latter because it is unpleasant and dangerous, especially the latter to young students, and both because they are comparatively imperfect in their effects. For example: I have often known an insect, especially one of the large bodied *Bombycids*, that recovered after having been apparently killed by chloroform, and even after having been pinned out in the case. The result usually is that it is seriously injured by flapping about. Chloroform is an anæsthetic and not a poison, and its effect soon passes off unless its action is renewed or long continued so as to insure death.

In regard to cyanide of potassium, I may state that last year I found one of my cases bady infested with the fur moth (*T. pellionella*). I put an open bottle containing cyanide of potassium into the case and closed it. For a fortnight it remained so, when desiring to know the result of the poison, I opened it. It was strongly impregnated with the well known smell of cyanide. To my surprise, however, I could not find a dead moth, and the larvæ were as lively, after breathing for fourteen days the so-called deadly atmosphere, as if they had been all the time in the open air. As a substitute for both of these I have for years used no other insecticide for the purpose of killing my specimens than benzine or gasoline. The latter at fourteen cents a gallon, is merely nominal in cost

and perfectly efficacious in action. I use it without hesitation on the Lepidoptera in any quantity. With most of them it causes instant death, and with the few that slightly resist its effects the resistance is very short-lived. I recollect one day seeing a large *Cecropia* moth enter the room where I was sitting and alight on the knob of the door handle. I took my bottle of gasoline and poured some of the liquid on the body of the insect, when it dropped to the floor as if shot and never moved a wing. The result is not in all cases quite so rapid, but it is never tedious. By this means I prevent the mischief that ensues when a fine specimen flutters in a bottle of cyanide or chloroform for several minutes, as is often the case.

I employ the same plan with all insects, and with equal success. The moths that so long resisted the cyanide vapour, as mentioned above, at once yielded to the deadly gasoline, and in five minutes not a living larva was left in the case.

I need scarcely add that the use of this exceedingly volatile liquid never in the least degree injures the delicate plumage of the Lepidoptera. Many of my best specimens have been repeatedly drenched with gasoline. In five or ten minutes they are as dry as before it was applied.

Let me add one word more. I find the most convenient way of applying the gasoline is to carry it in an ounce phial, having a cork through which passes a finely pointed glass tube. The large outer end of this tube is capped with a small india-rubber capsule. The whole may be bought at a drug store for a few cents, under the name of a dropping tube. In this way the tube is always full of liquid ready to be squirted out on an insect in the net or even at rest in the open air, and the specimen is at once fit to be pinned out. This I do on the spot in a cigar box, or in one lined with cork, and so avoid an accumulation of material, which is a great annoyance to a man whose time is otherwise occupied, or indeed to any one at the end of a hard day's work.

The small weight of the outfit here required is an advantage not to be overlooked when compared with the weight of the loaded cyanide bottle usually employed. There are one or two other points which I should like to mention, but having already written more than at the outset I intended, I will forbear.

BOOK NOTICES.

The Butterflies of North America. By W. H. Edwards. Third Series, Part I., 4to. Houghton, Mifflin & Co., Boston.

It is with very great pleasure that we receive from our esteemed contributor, Mr. W. H. Edwards, the First Part of the Third Series of his magnificent work, "The Butterflies of North America."

The last part of Volume II. was issued in November, 1884. It is a matter of deep congratulation to all Lepidopterists that the talented author now sees his way to resume publication; but we regret exceedingly to learn from a notice in Science, of 4th February, that to enable him to continue his unselfish labours he had to sacrifice many of the valuable type specimens in his collection.

The Part which has just come to hand contains three plates and nine pages of descriptive letter-press. Of the former, which have been executed under the supervision of Mrs. Mary Peart, it is not too much to say that they are exquisite, and are all equal to the very best in Vols. I. and II.

Plate I. which is accompanied by a complete life history, illustrates *Colias Eurydice* Bd., var. *Bernardino* Edw., in all its stages, from egg to maturity, and also a female of var. *Amorphæ* Hy. Edw.

On Plate II. we have a life-like representation of *Argynnis Nitocris* Edw., male and female.

On Plate III. we find figures of *Argynnis Lais* Edw., a pretty little species (but belonging to the same group as *Cybele*, *Atlantis*, and *Electa*), discovered in the Northwest Territories by Capt. Gamble Geddes, in July, 1883. The artist has been particularly happy in the coloration of this plate, especially so in catching the peculiar dull ochrey-brown tint which is characteristic of the female. Of most interest to Canadians, however, is the fact that although this species is abundant in certain parts of the Northwest Territories, easily accessible, and comparatively well settled, nothing is known of its preparatory stages. The eggs of the species belonging to the same group are easily obtainable by tying females over growing plants of violets. Surely some of the readers of the *Canadian Entomologist* have friends living in the Calgary District, or at McLean, where it is very abundant, who, even if not entomologists, would, were the scientific importance of the results placed before them, at any rate take the trouble to confine a few females in gauze bags over living plants, and send Mr. Edwards the eggs. There is very little trouble about this matter; living roots of violets can be sent by mail in a piece of oiled-paper, and will grow easily, if kept watered, in any of the tins used for canned vegetables (flower-pots are rare commodities in the N. W. T.) All that is necessary is to bend two pieces of wire so as to make a pent-house over the plant, and then placing a bag of muslin over the whole, secure it by means of an elastic band round the top of the can. This should be kept out of doors in a shady spot.

The importance of Mr. Edwards's studies of the Diurnal Lepidoptera of North America is perhaps hardly appreciated, until we remember that, with the exception of a few of our commonest butterflies, almost nothing was known of their life-histories until he turned his attention to them in 1868. At the present time, however, it is far otherwise; for by close study, diligent care, and accurate observation, he has himself worked out the complete life-histories of a large proportion of the recorded North American species. Moreover, many discoveries of great interest have rewarded his constant efforts: The tri-morphism of *Papilio Ajax* and *Colias Eurytheme*, the seasonal dimorphism first of *Grapta Interrogationis*, then of others in the same genus, as well as the effects of cold upon larvæ and the perfect insects, may especially be referred to.

There was a marked advance in Vol. II. over Vol. I. in the amount of information given concerning the life-histories of the species described. This is accounted for in the prefatory notice of the present part as follows:—

"When Vol. I. was undertaken, in 1868, nothing was known by myself or any one else, of eggs, larvæ, or chrysalids, except of the more common butterflies. As an egg or larva could but rarely be traced back to a particular female, it was impossible that much knowledge could be gained of the life-histories. Scarcely any advance in this respect had been made, in fact, since the time of Abbott, about 1800. . . . But in 1870, I discovered an infallible way to obtain eggs from the female of any species of butterfly, namely, by confining her with the growing food-plant . . . and from that day to the present I have so obtained eggs at will . . . and have reared larvæ without end. In this way, many cases of polymorphism have been established, and the position of many doubtful forms settled. A light has also been thrown on the limits of variation in species. In every case I have preserved descriptions of the several stages . . . Of a large proportion, also, Mrs. Peart has executed colored drawings, magnified when necessary, and my albums contain nearly one thousand figures."

Mr. Edwards concludes: "And so, in this Christmas time of 1886, I commend Vol. III. to the good will of the friends who have made my small audience for so many years."

Surely we may go further—a long way further—than this, and commend it not only to the few friends who have had the good fortune to listen to Mr. Edwards's teaching in the past, and perhaps to catch some of his enthusiasm; but also to every entomologist or possessor of a library, whether in America or any other part of the world, who wishes to have the most complete, as far as it goes, accurate, and, for the style of the work, the cheapest—in short, *the best*—work yet published upon the Butterflies of North America.

The Butterflies of North America. By W. H. Edwards. Third Series, Part II.

The second part of the new series of this superb work contains the usual three exquisitely finished coloured plates of butterflies. The first illustrates the Californian *Colias Harfordii* Hy. Edwards, and its variety *Barbara*, giving no less than nine pictures of the imagines, and more than a dozen of the earlier stages ; the second *Argynnis Coronis* Behr., giving both the upper and under surfaces of the male and female of this beautiful Californian species, which extends northward as far as our own Northwest Territory, where it has been taken by Capt. Gamble Geddes ; the third plate fully illustrates all the stages of *Neonympha Gemma* Hubn. and *N. Henshawi* Edw. There is the usual letter-press description of all the species figured, and also a notice of *Argynnis Callippe* Boisd. It is hardly necessary to add that no Lepidopterist's library can be considered complete without a copy of this admirable work.

Report of Observations of Injurious Insects and Common Farm Pests during the year 1886, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, 8vo., 112 pages. London : Simpkin, Marshall & Co.

We must congratulate our esteemed friend upon the publication of her Tenth Report. It is full of interesting matter and well illustrated with excellent wood-cuts, chiefly the work of the talented authoress. The principal noxious insects treated of are "Earwigs" affecting cabbage—a pest that we are happily free from in this country ; Clover Weevils, the Hessian Fly and other wheat insects, the Hop Aphis, Mustard Beetles, the Horse and Ox Warble-flies, etc. Economic Entomologists everywhere may learn much from these pages ; though the insects treated of are for the most part British, many of them have been transported to this side of the Atlantic and to other distant regions, where they have wrought incalculable damage to crops of various kinds.

Synopsis of the Hymenoptera of America, North of Mexico. By E. T. Cresson. Part I. Families and Genera. 8vo., 154 pages.

This valuable work, published as a supplementary volume by the American Entomological Society in Philadelphia, is a very much needed contribution to the literature of this difficult order of insects. With this assistance towards classification, we trust that many will be encouraged to collect and study these particularly interesting creatures.

Transactions of the American Entomological Society, and Proceedings of the Entomological Section of the Academy of Natural Sciences. Philadelphia. Vol. xiii., 1886.

This volume is replete, as usual, with papers of high scientific value by such well-known authorities as Dr. Horn on Coleoptera, Messrs. Ashmead, Blake, and Howard on Hymenoptera, The Rev. Messrs. Holland and Hulst on Lepidoptera, and Prof. Williston on Diptera.

The Mulberry Silk-worm ; being a Manual of Instructions in Silk Culture. By Prof. C. V. Riley. Bulletin No. 9. Division of Entomology, U. S. Department of Agriculture.

Our Shade Trees and their Insect Defoliators; being a consideration of the four most injurious species which affect the trees of the Capital; with means of destroying them. By Prof. C. V. Riley. Bulletin No. 10.

The species referred to are the Elm-leaf Beetle (*Galerucha xanthomelæna* Schrank.); the Bag Worm (*Thyridopteryx ephemeræformis* Haw.); the White-marked Tussock-moth (*Orgyia leucostigma* Sm. & Abbot); and the Fall Web-worm (*Hyphantria cunea* Drury).

Reports of Experiments with Various Insecticide Substances, chiefly upon insects affecting garden crops, made under the direction of the Entomologist. Bulletin No. 11.

Miscellaneous Notes on the Work of the Division of Entomology for the season of 1885. Prepared by the Entomologist. Bulletin No. 12.

These four works abundantly testify to the value of the Government Commission on Entomology at Washington, and to the ability and industry of its members.

Arsenical Poisons for the Codling Moth (*Carpocapsa pomonella* L.) By Dr. S. A. Forbes, State Entomologist of Illinois. Bulletin No. 1.

Another valuable contribution to Economic Entomology, the result of careful and painstaking work in the field.

Rhopalocera Malayana: A description of the Butterflies of the Malay Peninsula. By W. L. Distant. London, 1882–86, 486 pages, 46 plates.

A short time ago we called attention to a work in progress on the Butterflies in India. Immediately thereafter there came to hand the final part of another notable work on the butterflies of a region still nearer our antipodes—the Malay Peninsula. In this instance the work was undertaken by the author under peculiarly favourable circumstances, inasmuch as all pecuniary anxiety was removed by the appearance of a Maecenas in the person of Mr. D. Logan, of Penang, to whom all credit is due by naturalists the world over, not only for the generous way in which he has allowed the work to be gotten up and illustrated, but for his excellent choice of an author. For Mr. Distant, on his side, has performed his task in a very scholarly manner, and given us a book leaving little to be desired, beyond that constant and bitter craving of naturalists for a knowledge of the earlier stages of life of the insects treated. We could indeed wish that the structural characteristics of the larger divisions had been more amply treated, and that the author had not rested satisfied with groupings in the Lycaenimæ and Hesperidæ, newly manufactured, confessedly artificial and temporary, and to which the very descriptions which follow do violence. But the excellence of the entire work, the consistent manner in which the task has been carried out, the technical skill, excellent judgment and broad learning everywhere displayed, as well as the very considerable addition to our knowledge involved, disarms adverse criticism and invites only praise. Would that such a Maecenas and such an author might oftener company together!

The work is published in quarto in sumptuous style, is unexceptionable in typography and profusely illustrated. Besides 46 plates of some of the best chromo-lithographs of butterflies which we have ever seen, there are 129 wood cuts scattered through the text, generally illustrating special structural features, especially in neuration and leg structure, which are of the greatest value. The author, as would have been expected of one of our best lepidopterists, familiar with the structure as well as the early stages, the form and colouring of butterflies, has followed closely in the lines of classification made prominent in recent years by Bates, in which the Hesperidæ are immediately preceded by their

nearest allies, the Papilionidæ. It remains only to say that a good deal of interesting reading will be found scattered through the portly volume, and that there are points in the preface worthy of careful attention. About 500 species are described.

The Ottawa Naturalist. Vol. i., Nos. 1 and 2, April and May, 1887.

A welcome addition to our few Canadian serials on Natural Science; we heartily wish it abundant success.

A Revision of the Lepidopterous Family Saturniidæ. By John B. Smith. Proceedings of the United States National Museum. Washington, Dec.. 1886.

A very valuable illustrated paper on this interesting family of moths.

North American Lepidoptera: The Hawk Moths of North America, by A. Radcliffe Grote, A.M. Printed by Homeyer and Meyer, Bremen, 1886.

The above is the title of an interesting brochure by our old friend Prof. Grote, who has done so much to advance our knowledge of the North American moths. The press work is superb. For clearness of print, nice paper, and excellent taste in the selection of contrasting type for the heading of the sections, this work is a model.

After a graceful dedication to Prof. William Saunders, former editor of the *Canadian Entomologist*, our author gives directions for collecting and preserving insects, followed by a chapter on the relation and habits of the *Sphingidæ*. He then takes up their classication, beginning with the sub-family *Macroglossinæ*. under which he includes the genera *Hemaris*, *Lepisesia*, *Thyreus*, *Enyo* and *Deidamia*. Then follow the sub-family *Chœrocampinæ*, including the genera *Everyx*, *Ampelophaga*, *Deilonche*, *Deilephila* and *Philampelus;* the sub-family *Smerinthinæ*, including the genera *Calasymbolus*, *Paonias*, *Cressonia* and *Triptogon;* and the sub-family *Sphinginæ*, including *Ceratomia*, *Daremma*, *Diludia*, *Dolba*, *Phlegethontius*, *Atreus*, *Ellema*, *Sphinx* and *Dilophonota*.

Prof. Grote divides the time of the work on our lepidoptera into three periods: The first including that of Abbot, Boisduval, the elder LeConte, Say, Peck, Harris, Gosse, Kirtland, and their historian, Dr. J. G. Morris. The second period, the one which he calls the "Renascence," is the period in which the American Lepidopterists catalogue the different families of the lepidoptera and thus lay the foundation for present and future discoveries. This period, which came to an end with the appearance of Grote's New Check List, "was a time during which a great deal of work was performed with good humor and at considerable self-sacrifice," and no one did his share of this work, which was more or less drudgery, more cheerfully than did Mr. Grote himself.

The author says that the writings of our entomologists have a flavouring of the localities from which they emanate, thus, "in some way the scent of the Maine woods has got into Prof. Fernald's writings," and we may say in return that a vein of poetry runs all through this charming little work which we are now reviewing.

OBITUARY.

Since the last Annual Report appeared, our Society has sustained a serious loss by the death of one of its most prominent and highly esteemed members, Mr. George J. Bowles, of Montreal, for a great many years a member of the Society. He was also for the greater part of the time on the Executive Council, and did valuable work, not only in

writing for our publications, but also in fostering and disseminating as widely as possible a love for Entomology. He began to study this branch of science when quite a young man, in the neighbourhood of Quebec. Since that time he has kept quietly on persistently collecting, working, and helping others right up to the day of his death. After his removal to Montreal he took a very active part in the preliminary arrangements and institution of the Montreal Branch of our Society, of which he was for several years the President, and before which he read some valuable papers, many of which have appeared in the Annual Reports or in the *Canadian Entomologist.*

His large collection contained specimens of all the different orders of insects ; but he made a specialty of the Lepidoptera, which were well represented by long series of Canadian and Exotic species. It is highly satisfactory to hear that this collection has been transferred to the museum of McGill University, where the good work of instruction by its means will continue to be carried on with even greater facilities than were possessed by the one who built it up with so much care.

Mr. Bowles was a native of Quebec, in which city he was born in 1837. He was a kind and religious man, and always had a helping hand for those who knew less than himself. His quiet, modest manner made him a favourite with all his associates, while his ability as a naturalist was acknowledged by all who came into contact with him.

He leaves a wife and three children, for whom, in their bereavement, our deepest sympathy is called forth.

ENTOMOLOGIST FOR BRITISH COLUMBIA.

It is with much pleasure that we have just learnt of the appointment of the Rev. George W. Taylor, of Victoria, Vancouver Island, B. C., as Honorary Provincial Entomologist of British Columbia. Mr. Taylor has been an active member of our Society for some years, and has done much good work, not only in Entomology, but in general Natural History, by working up the little known but exceedingly interesting fauna of Vancouver Island. He is one of the best Conchologists in the Dominion, and has the finest collection of British Columbian shells extant. His knowledge of Ornithology and Botany will materially enhance the value of his work as Provincial Entomologist, and his appointment cannot but result in great benefit to the farming community of the Province. We tender our sincere congratulations, not only to Mr. Taylor, but also to the Minister of Agriculture and the Provincial Legislature, for the wisdom that has been displayed in the choice of an incumbent for this important office. There are many "first-class pests" which require attention in our Pacific province already, and doubtless, now the Canadian Pacific Railroad is completed, many others from the east may be expected to be introduced by that means, and it is only by having the services of a trained scientific student at their disposal, to identify the marauders, and give information concerning the habits and best means of remedying their attacks, that the farmers can hope to protect themselves against the injuries yearly inflicted by insects.

REMEDIES FOR NOXIOUS INSECTS.

BY REV. C. J. S. BETHUNE, PORT HOPE.

In our Annual Report for last year (pages 55-64) I began an account of the remedies that have been found by practical experience the most useful in counteracting the ravages of destructive insects, and, taking them in alphabetical order, described those employed against our chief foes, as far down as the "codling worm." The next insect on our list is

The Colorado Potato Beetle.

This formidable pest of the potato-grower is now far too well known to require any description. The accompanying wood-cut (Fig. 6) illustrates the insect in all its stages:

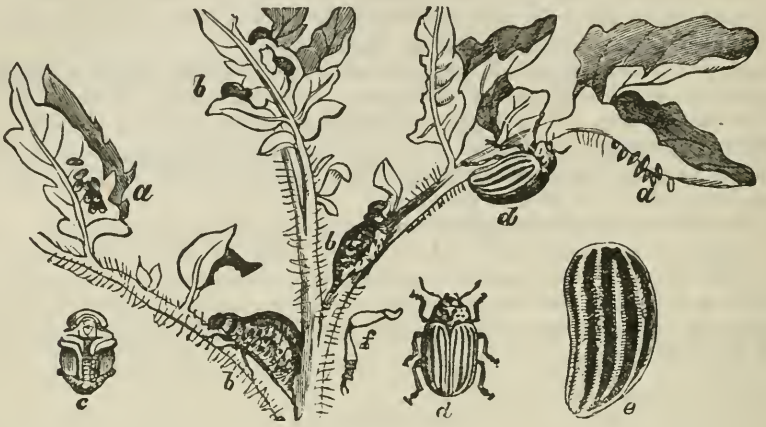


Fig. 6.

a the eggs; *b* the orange coloured larva or grub at different periods of growth; *c* the chrysalis or pupa; *d* the perfect beetle; *e* one wing cover enlarged; *f* a leg magnified.

Though this destructive pest is now widespread over all the eastern half of this continent, wherever potatoes can be grown, and appears in infinite numbers everywhere, it can yet be kept in check without much trouble or expense. As almost everybody knows, Paris green is a perfect remedy for it, and by its timely use almost the whole of the crop can be saved. The main point is to apply the poison carefully and promptly as soon as the first brood of the insect appears in the spring; by so doing the chances of a second attack are very much diminished, but careful watch must be kept throughout the season and the poison applied whenever any of the insects appear. If all the farmers throughout the country would unite in using this remedy, we should in a few years so nearly exterminate the insect as to have little trouble from it. The most satisfactory mode of using the poison, if the Paris green is pure, is to mix one teaspoonful in a pailful of water and carefully sprinkle the affected parts with it; an ordinary watering-can will be found most convenient. As, however, the poison is often adulterated, it may be found necessary to use two or even three spoonfuls instead of one; by trying the smaller quantity first and watching its effect, the proper proportion may be readily ascertained. In the case of the fully developed beetles a poison of much greater strength is required than for the more delicate grubs.

An objection to the use of Paris green has often been raised on the ground that it injures the potato tuber and renders it a dangerous article of food by the absorption of arsenic. Very careful and exhaustive experiments have been made in order to ascertain whether any of the poison gets into the tubers or the roots and stems of the plant, with the result that in no instance could any trace of the arsenic be found. The foliage to which it is applied is often damaged to some extent by the corrosive action of the poison, especially when too strong a mixture is used, but none of it is actually taken into the plant so as to be stored up in the tuber. Any of the arsenic that reaches the ground is speedily neutralized by the oxide of iron in the soil. Of course, in using this or any other virulent poison, care must be taken to keep it out of the reach of children, and to avoid using it in a garden where children play, or in a field to which cattle have access. In such exceptional cases the insect may be kept in check by the more laborious method of hand-picking.

The following extract from an agricultural paper will shew what pains are taken in Germany to prevent the spread of this noxious insect:—

"In the December number of *Agricultural Science* is a translation from the Berlin *Official Gazette* of an account of how the introduction of the Colorado potato beetle into Germany is prevented. The beetle was first discovered on a potato field in the locality of Latitzch. As soon as its appearance was positively settled, an examination was first made of all the fields the beetle could possible have visited. Then for a distance of six miles about the place, placards with coloured illustrations of the insect were distributed among the people to put them on their guard. Eight smaller potato fields were thus discovered to be affected. All these grounds were then strictly quarantined. The potato stalks were most carefully searched for eggs, larvæ and beetles. Next the soil about the roots and stems was examined, and afterwards the tops were cut off and collected in linen-lined baskets. These were placed in pits four feet deep, in layers four inches thick, and saturated with raw benzine oil, destroying the plants; on top of these were placed other layers until a height of twenty inches was reached, then earth was placed on them. The infested fields were ploughed nearly a foot deep, experienced laborers followed the ploughs, collecting any larvæ, chrysalids, or beetles turned up. Then the land was harrowed once, being gone over again by laborers for insects. After the search was ended the fields were thoroughly saturated with raw benzine oil, 165 lbs. being used to 47 square feet. The fields were shut up and no one allowed to go on them. Next year no crops will be grown here, but the fields will be again examined."

The Curculio of the Plum.

The fruit-grower in this Province has no more formidable enemy to contend against than the Plum Curculio (*Conotrachelus nenuphar*, Herbst.), the different stages of which are shewn in the accompanying wood-cut: *a* represents the grub much magnified; *b* the chrysalis, and *c* the beetle, both magnified; *d* the young fruit, shewing the crescent-shaped mark made by the insect, and the curculio, life size, at its work.

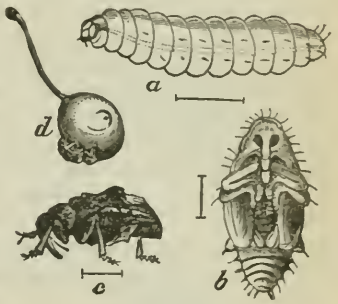


Fig. 7.

Until very recently the only remedies employed against this insect were laborious in their application and uncertain in their results; such, for instance, as jarring the tree and catching the falling insects in sheets spread beneath; trapping them under boards or other articles beneath the trees; planting in poultry yards, etc. Now, happily, a remedy has been discovered, comparatively easy of application, inexpensive, and almost certain in its good results—I refer to the plan of spraying the trees with a weak mixture of Paris green at the time the females are laying their eggs. Three-quarters of an ounce by weight of Paris green mixed with two and a half gallons of water has been found very satisfactory. The liquid must be sprayed all over the trees with a hand force-pump and applied in a fine mist-like spray till the leaves begin to drip. It has been found of advantage to mix a certain amount of flour with the Paris green in order to render the fluid more adhesive to the fruit. Three quarts of flour to a barrel (40 gallons) of water was found to be a satisfactory quantity. The time of application is just after the blossoms fall and when the fruit is of the size shewn in the wood-cut above. If applied before the blossoms are matured, the stigma of the pistil of the flower may be injured by the poison and the fruit prevented from formation. Another evil result is that the honey bees affecting the blossoms may all be poisoned, a fatality that has actually happened when apple trees were sprayed in a similar manner for the prevention of the codling moth. If, on the other hand, the application is delayed too long, the female beetles will have laid their eggs and the young curculios will be out of reach inside the plum.

Since the preparation of our last Report, Professor Forbes, State Entomologist of Illinois, has published an account of his experiments with arsenical poisons for the destruction of the codling moth of the apple. His results may be mentioned here as the

mode of application and the general treatment are the same for the plum curculio as for the apple worm. He states at the outset that "to this codling moth we may fairly attribute a loss to the farmers of Illinois of, say, four and three-quarters millions of dollars each year." He then proceeds to shew, as the result of his experiments, that—putting down the loss to one-half of the amount stated—"at least seven-tenths of that loss may be prevented by a single remedial measure," viz., the application of Paris green, as mentioned above. After giving an account of his experiments, Prof. Forbes states that they show "that eighty-six per cent. of the apples which would have fallen from codling moth injuries have been preserved from falling, and that fifty-nine per cent. of the picked apples, which would have become wormy, remain uninjured; or, taking all the apples from these trees together and comparing with the entire crop of the check trees (which had not been sprayed) we shall find that, of the apples thus exposed to damage, almost exactly seventy per cent. have been saved by our treatment." This is certainly eminently satisfactory.

Experiments were also made as to the effect of spraying the trees once, twice or three times, with this result: "The benefit to the picked fruit apparent from a single spraying, stands at forty-seven per cent., and that from twice spraying at ninety per cent., while that from thrice spraying falls away again to seventy-seven per cent. Or, summarizing still more briefly, we may say, in general, that the results of once or twice spraying with Paris green in early spring, before the young apples had drooped upon their stems, resulted in a saving of about seventy-five per cent. of the apples exposed to injury by the codling moth." It is most important to bear in mind that, in the case of apple trees especially, the spraying must be done before the apples have begun to hang downward; if deferred till a later period there is positive danger that some of the poison will be retained on the fruit and held in the cavity where neither wind nor rain can dislodge it. Enough poison from careless treatment may thus be retained in the apples to be dangerous to the health, if not to the life of the consumer.

The use of this mode of prevention for the plum curculio has, we are glad to find, been already tried in Ontario. Prof. Saunders, in his speech at the meeting of the Entomological Society at Ottawa in October, stated that he had in this way saved his own fruit, and that the remedy had been found effective at Owen Sound and Goderich also.

There is no doubt that the method of spraying with Paris green will be found advantageous when applied for the destruction of the codling moth and plum curculio, at the same time reducing very much the ravages of insects that devour the foliage of these fruit trees, especially the tent caterpillars of the apple and many other destructive worms.

Currant Borers.

There are two species of insects that prove injurious to the currant by boring into the stems and rendering them hollow and weak, and in many cases causing their death. Though similar in their operations, the two insects are utterly unlike, one being a moth and the other a beetle. The moth is commonly called the Imported Currant-borer, (*Ægeria tipuliformis*, Linn) as, like so many others serious insect pests, it has come to us from Europe.

Fig. 8.

Fig. 8 represents the moth, a pretty wasp-like creature, with a bluish-black body, crossed by three narrow golden bands; on the thorax and at the base of the wings there are also streaks of the same colour. The wings are transparent, with veins and a bordering of brownish-black with a coppery lustre. The female lays her eggs in June, singly, near the buds, where, in a few days, they hatch into tiny caterpillars and eat their way into the centre of the stem. Here they burrow up and down through the pith until they have formed a cavity of several inches in length. When fully grown the larva changes into a chrysalis (Fig. 9 represents both caterpillar and chrysalis, much magnified), from which the moth issues in the following June.

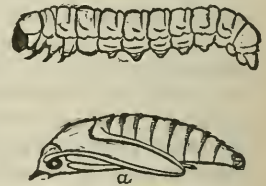


Fig. 9.

This insect affects both the white and red currant, and to some extent the gooseberry also. Its presence may be known by the sickly appearance of the foliage and the poorness of the fruit. The remedy for it is simply to cut off and burn all the affected stems either in the autumn or early spring, before the final transformation into a moth.

The other borer, the larva of a beetle, is a native insect, and is therefore commonly called the American Currant-borer (*Psenocerus supernotatus*, Say). Fig. 10 represents the beetle magnified to show the markings and in outline of the natural size. The larva or grub may be distinguished from that of the preceding insects by its smaller size and want of feet. Its habits are much the same, as it feeds upon the pith and burrows up and down through the stalk, but it is more destructive than the larva of the moth from its gregarious life. Usually a number of the grubs, sometimes as many as eight or ten, are found in the same stem, and speedily cause its death. The only remedy seems to be, as in the former case, to cut off and burn all the infested stalks.

Fig. 10.

Currant Worms.

A number of worms feed upon the leaves of the currant and gooseberry, but only two of them are so commonly destructive as to require notice here. The first and greatest enemy of the gardener in the cultivation of these fruits is the imported Currant Saw-fly (*Nematus ventricosus*, Klug). This insect has come to us from Europe, and was first observed in America in 1858, since which time it has spread over a large part of the continent. Fig. 11 represents (*a*) the male, and (*b*) the female Saw-flies; the hair-lines at the side shew the natural sizes. The body of the male is black above, with a few dull yellow spots, and beneath yellowish, with bright yellow legs. The female is larger and is especially distinguished by its honey-yellow body. It is well that gardeners should become familiar with these insects in their perfect state, as oftentimes they may be captured on the bushes and readily killed.

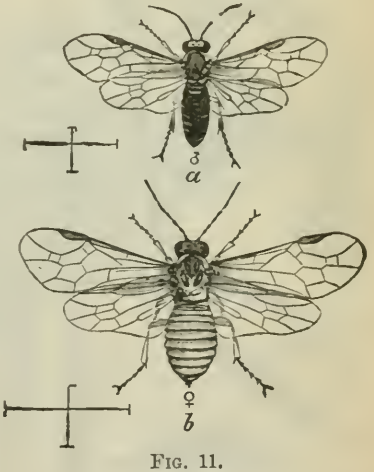


Fig. 11.

The worms are much more familiar to every fruit-grower. They resemble the caterpillars of butterflies and moths very much, but differ from them in having feet under the middle segments of the body and many more in number, and also in their habit of curling the terminal segments. When first hatched they are very small, of a whitish colour, with a large head, having a dark round spot on each side of it. They are then gregarious, feeding in companies of thirty or forty on a leaf till they have consumed all the softer parts of it and left nothing but the frame-work remaining. They soon increase in size, being voracious feeders, and gradually scatter all over the bush. Their colour changes with their growth after successive moults, first becoming apple-green, then green with many black dots, and finally plain green, tinged with yellow at each end. The chrysalis is formed within a tough silken cocoon, nearly oval in shape and brownish in colour, and is made among dry leaves or rubbish on the ground, or in the earth a little way beneath the surface. The fly soon emerges and thus there are several broods during the season, necessitating continual watchfulness on the part of the gardener.

The most effective and simplest remedy is to be found in the application of powdered hellebore mixed with water, in the proportion of an ounce to a pailful, and showered freely over the foliage with a watering-can. If thoroughly applied, especially to the leaves about the bottom and in the middle of the bush, most of the worms will be found

dead in a few hours. Constant inspection of the bushes is, however, required in order to apply the remedy at once whenever a new brood makes its appearance; a few days neglect will often result in the complete stripping of the foliage of the bush.

Fig. 12.

Another mode of counteracting the attacks of these worms is hand-picking. This can be done most effectively before the eggs are hatched, as they are deposited along the ribs on the under side of the leaves, as shewn in Fig. 12. By turning over the lower leaves of the bush the lines of white eggs can readily be seen, or the presence of the young worms may be discovered by the little holes eaten through the leaf, as shown in the same wood-cut. If the leaves, with the eggs or young larvæ, are gathered and destroyed at this stage, before the worms have grown larger and scattered over the foliage, an immense deal of damage may be easily averted.

The other great pest of the currant and gooseberry is the Currant Span-worm (*Eufitchia ribearia*, Fitch), a well-known and often very destructive insect. In the caterpillar state it can be at once distinguished from the worms of the Saw-fly by its paler and more yellow colour, and by its habit of arching its body into a loop when moving from place to place. The accompanying wood-cut (Fig. 13) represents the caterpillar in this and other attitudes, and illustrates its mode of suspending itself by a silken thread when disturbed or alarmed. When full grown the caterpillar is about an inch long, of a whitish colour, with stripes of yellow running lengthwise and a number of black dots on each segment. It is a native insect and attacks the wild currant and gooseberry bushes in the woods as well as the cultivated varieties in gardens; it is also especially partial to the spicy-scented Flowering Currant, which is so frequently grown in gardens for the sake of its pretty fragrant blossoms. It generally occurs in large numbers, and if let alone will soon make sad work of the foliage of any bush it attacks, but fortunately there is only one brood in the year, and it is in consequence by no means so great a pest as the Saw-fly.

Fig. 13.

The moth, Fig. 14, is a pretty pale yellow creature, with its wings adorned with several dusky bands or spots, which vary very much in different specimens. It usually appears about the end of June, and may be seen in numbers flitting about the affected bushes in the daytime. It is a wise precaution to catch and destroy as many as possible before they have time to deposit their eggs for the next year's crop of caterpillars.

Fig. 14.

It is unfortunate that powdered Hellebore, which is so simple and effective a remedy for the Saw-fly worms, is not sufficiently powerful for the certain destruction of these hardier creatures. If it is used, it must be made of twice or thrice the usual strength. Paris

green would, of course, be effective, but it is too dangerous a remedy to employ in a garden, especially as these worms do not make their appearance till the fruit is well-formed. The only method, apparently, that can be recommended, is hand picking; this is not very difficult, as by shaking the bush the worms will let themselves down by their silken threads, and can then be easily seen and gathered.

Cut Worms.

These noxious creatures, the caterpillars of various night-flying moths, are but too well known to gardeners everywhere, from their annoying habit of cutting off young cabbage and other plants when first set out in the beds. They usually attack the young and tender plants when they are only a few inches high, completely severing the stem just above or below the surface of the ground. They are by no means particular as to the kind of plant, but will destroy spring wheat, Indian corn, any kind of young vegetable, tender annual, or even weed. Some species also have the further evil propensity of climbing trees at night and doing great damage to the expanding foliage and fruit blossoms.

The number of different species of Cut-worms is very large, but the accompanying illustrations will enable any one to recognize some of the commonest forms in both the caterpillar and winged states. Fig. 15 represents the Greasy Cut-worm, so-called from the appearance of the caterpillar; the moth, (*Agrotis ypsilon*, Rott,) into which it transforms, is shewn beneath it. This is one of the commonest of all our species, and has apparently several broods in the year, as the moths can be taken by "sugaring" during the summer and quite late in the autumn.

Fig. 15.

Fig. 16.

The other illustration, Fig. 16, represents the caterpillar and moth of the Dark-sided Cut-worm (*Agrotis Cochrànii*, Riley). This species is notorious for its nocturnal habit of climbing apple and other fruit-trees and destroying the buds and young leaves.

Many methods have been tried for the destruction of these pests, but owing to their nocturnal habits it is very difficult to cope with them successfully. Whenever a young plant is noticed to have suddenly withered and died, the culprit may, in almost every case, be found within a few inches of the plant and just below the surface of the ground. It is unnecessary to add that when found he should be ruthlessly crushed under foot. Sprinkling the plants with air-slaked lime, ashes, or powdered hellebore is recommended. When setting out young tomato or cabbage plants, they may be protected by wrapping round the stem of each a piece of paper, extending a few inches up the plant and a little way down into the ground. Where the buds and leaves of fruit-trees and vines are found to be destroyed without apparent cause, search should be made in the ground at the base of the tree, or under any rubbish lying near, and the enemy will generally be found.

The following remedy is quoted by Dr. Lintner, from a correspondent, in his Second Annual Report, and is worth trying:—"One year ago I had a patch of beans entirely destroyed by cut-worms. I planted it over; as soon as they came up the worms began again. I dissolved half a pound of saltpetre in three pints of water, mixed that thoroughly

with one-half bushel of dry ashes, and sprinkled the ashes on the beans just as there was a shower coming on; the rain washed the ashes all off into the ground, and I had no more trouble with the worms, but had a good crop of beans."

Professor Riley (First Missouri Report) says:—"From the orchard planted upon light warm soils, the climbing cut-worms can be driven away entirely by claying the ground about the trees; a wheelbarrow full is well-nigh enough for each tree when spread around its base and as far as the limbs extend. This is the most thorough and lasting remedy."

The Fall Web-Worm.

This very destructive insect (*Hyphantria cunea*, Drury; *textor* Harris), is a familiar nuisance all over Canada and the northern and middle States. Last autumn Professor Saunders observed it defoliating trees in British Columbia; and last year (1886), it became so serious a plague in Washington, D.C., that the attention of the public authorities was drawn to it, and the Entomological Commission was called upon to devise a remedy for its attacks. Professor Riley states in his report (page 521) that: "the city of Washington, as well as its vicinity, was entirely overrun by the caterpillars, with the exception of trees and plants the foliage of which was not agreeable to the taste of this insect; all vegetation suffered greatly. The fine rows of shade trees which grace all the streets and avenues appeared leafless and covered with throngs of hairy worms. Excepting on the very tall trees, in which the highest branches shewed a few leaves, too high for the caterpillars to reach, not a vestige of foliage could be seen. The trees were not alone bare, but were still more disfigured by old and new webs made by the caterpillars, in which bits of leaves and leaf-stems, as well as the dried frass, had collected, producing a very unpleasant sight. The pavements were also covered with this unsightly frass and the empty skins of the various moults the caterpillars had to undergo were drifted about with every wind and collected in masses in corners and tree boxes. As long as the caterpillars were young and still small, the different communities remained under cover of their webs and only offended the eye; but as soon as they reached maturity and commenced to scatter, prompted by the desire to find suitable places to spin their cocoons and transform to pupæ, matters became more unpleasant, and complaints were heard from all those who had to pass such infested trees. In many localities no one could walk without stepping upon caterpillars; they dropped upon everyone and everything; they entered flower and vegetable gardens, porches and verandas and the house itself, and became, in fact, a general nuisance."

The above extracts are given in order to show what a plague this insect may become, and to warn our readers how serious an injury it may cause to an orchard or garden if no effort is made to keep it in check.

The large unsightly webs made by this insect are no doubt familiar to everyone; they are especially noticeable on ash and wild-cherry trees, but may often be found on fruit trees as well. They may be distinguished from the webs of the tent caterpillar by their later appearance in the year in this country (in the south there is a spring brood as well), and by their enveloping two or three feet of the extremity of a branch, instead of being constructed in the fork of a limb. The accompanying illustration, Fig. 17, represents the caterpillar, chrysalis and perfect insect. The moth is a pretty little white creature; it flies only at night, and is consequently not often observed. It appears about the end of May, or early in June, and lays its eggs on the under side of leaves near the ends of branches; from these the caterpillars come out from June to August, according to the locality. The winter is spent in the chrysalis state.

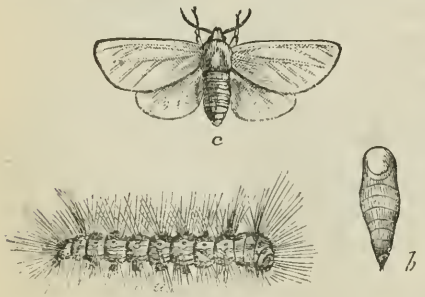


Fig 17.

The simplest and generally the most effective remedy is to cut off the portion of the bough covered by the web and to destroy by burning or treading under foot the enclosed

family of caterpillars. This should be done as soon as the webs are noticed, not only for the sake of preventing further damage, but also because the worms, when nearly full-grown desert the web and scatter over the surrounding foliage. It is well also to kill the caterpillars as quickly as possible after cutting down the web, for they are very lively creatures and will make their escape in numbers if not speedily attended to. If the web should be in such a position that it cannot be conveniently cut off, or should involve the sacrifice of a limb that cannot be spared, it may be destroyed with its contents by burning. This can easily be accomplished by means of rags soaked with coal oil or tar and fastened to the end of a long pole. As a substitute for the rags, a piece of porous brick has been strongly recommended. Professor Riley quotes the following mode of making a brick-torch: "Take a piece of soft brick (one from the outside of a kiln would probably answer best) trim it to an egg shape, then take two soft wires, cross them over this brick, wrapping them together around the opposite side so as to firmly secure it, now tie this end to a long stick such as the boys get at the planing-mills, by wrapping around it, then soak the brick in coal oil, light it with a match, and you are armed with the best and cheapest weapon known to science. Holding this brick torch under the nests of caterpillars will precipitate to the ground all the worms on one or two trees at least from one soaking of the brick, and it can be repeated as often as necessary. Then use a broom to roll them under it, and the work will be done, the controversy ended and the trees saved."

Other remedies may be resorted to, such as spraying the trees with Paris green, as recommended for the codling moth and plum curculio, but this would not be satisfactory unless the damage was very serious and the caterpillars had been left too long undisturbed and had grown to maturity. Pruning or burning, or both, are the simplest, easiest, most effective and least dangerous remedies. To these may be added the further precaution of gathering up and burning all fallen leaves, weeds and rubbish that may be found around the base of a tree that has been badly infested. This should be done late in the autumn in order to destroy as many as possible of the chrysalids, that would otherwise remain over winter and produce the moths for a fresh attack the following year.

The list of common noxious insects has by no means been exhausted, there are many more "first-class pests" which are only too well known to our farmers and gardeners. These we must now reserve for a future occasion, but we believe that the many remedies already given in the reports for last year and this will supply methods of treatment that may be employed in numbers of other cases. The main point is to know enough of the life-history and habits of the enemy to understand what remedy to select and especially when to apply it. In most cases, success entirely depends upon attacking the insect foe at the right moment; a few days' delay may involve the loss of the crop, and render the application of the remedy a mere waste of labour. Most people have not the time or the inclination to study these creatures, and therefore it is that we, who are especially devoted to this investigation, believe that we are doing good service to the farmers and gardeners of our country, and therefore to the whole community, by spreading amongst them some knowledge of the appearance and life and habits of these most pernicious and destructive beings.

A SKETCH OF CANADIAN ORTHOPTERA.

BY F. B. CAULFIELD, MONTREAL, P.Q.

The destructive insects commonly known as grasshoppers or locusts, with the crickets, cockroaches, walking sticks and earwigs, belong to the order called Orthoptera or straight winged insects. The insects composing this order, unlike the beetle or butterfly, pass through their transformations by a series of simple moultings, moving about and eating from the time they leave the egg until the close of their existence, the principal difference between the larva and adult insect being that of size, and, in the greater number

of species, the presence of wings. Both old and young are voracious eaters, having the mouth parts highly developed, the mandibles being fitted for both cutting and grinding.

From the beginning of summer until late in the fall our gardens and pastures swarm with crickets and locusts, and the amount of grass, leaves, flowers, etc., eaten by these ever hungry little creatures must be very considerable, and is especially noticeable during dry and hot seasons. The Orthoptera have long been celebrated for the musical powers with which many species are endowed. The poets have sung to the "love songs of the grasshoppers," but in reality these merry little fellows are instrumentalists, not vocalists, as they, like all other insects, breathe through spiracles and are of course voiceless. So far as I am aware the musical power is confined to the crickets, grasshoppers and locusts, the remaining families being silent.

In reality the song of an orthopterous insect is a sexual call and is almost entirely confined to the males—entirely so in the crickets, some species of which go through quite an elaborate performance, as may be easily seen by watching the common striped cricket (*Nemobius vittatus*).

When a male of this species wishes to attract the notice of the female, he advances towards her, and, raising the wings and wing-covers, rasps them together, thereby producing a shrill, creaking sound, now and again jerking himself forward with a convulsive movement, touching the female with his antennæ, at times dancing around in a frantic manner. Should the female be pleased with his attentions, she turns around and, seizing him, draws him beneath her, when copulation takes place. Should his serenade prove unsuccessful, the little minstrel either stops shrilling or turns his attention to another female. I have not observed the courtship of our other species, but it is probably much the same in all.

Mr. W. H. Harrington, speaking of *Œcanthus niveus*, says: "An interesting feature of its concerts is one of which I have not been able to find any mention in books accessible. While the male is energetically shuffling together his wings, raised almost vertically, the female may be seen standing just behind him, and with her head applied to the base of the wings, evidently eager to get the full benefit of every note produced."

The courtship of *Ectobia Germanica* is very similar to that of *Nemobius*, but is unaccompanied by any sound, nor are the wings shuffled together. The male follows the female until her attention is attracted, when, turning around and raising the wings until they form a right angle with the body, he backs up to and is seized by the female. I have only seen actual copulation take place in *Nemobius*, but have little doubt that in both Blattidæ and Gryllidæ the male never takes possession of the female by force.

Another remarkable feature of the Orthoptera is the facility with which they elude observation. This is largely owing to the similarity of their colours to the surroundings amidst which they live, and probably serves as a means of defence against their enemies. No doubt many observers have noticed that it is easy to see a grasshopper or locust when it is jumping or flying, but it is just the reverse when the creature remains quiet. A familiar example is the large rattling locust, whose gaily coloured under-wings make it so conspicuous an object when hovering in the air, but which becomes almost invisible when resting with closed wings on the bare dry gravel or dusty roadside; and equally difficult to detect are those green species that live in damp meadows, or on shrubs and trees, their colour just matching the grass and leaves amongst which their lives are spent.

Six families of Orthoptera are represented in Canada, viz.: Gryllidæ, Crickets; Locustidæ, Grasshoppers; Acrididæ, Locusts; Phasmidæ, Spectres or Walking Sticks; Blattidæ, Cockroaches; and Forficulidæ, Earwigs.

Dr. Harris, in his well-known work on Injurious Insects, says: "Cockroaches are general feeders, and nothing comes amiss to them, whether of vegetable or animal nature, but by far the greater part of the Orthopterous insects subsist on vegetable food, grass, flowers, fruits, the leaves and even the bark of trees; whence it follows, in connection with their considerable size, their great voracity, and the immense troops or swarms in which they too often appear, that they are capable of doing great injury to vegetation."

FAMILY 1.—GRYLLIDÆ (CRICKETS).

The Crickets are robust, thickset insects with a large head and thorax. The antennæ are long and very slender. The wings are laid flat on the body, the outer edge of the front pair being bent down so as to slightly overlap the body. The hindmost thighs are thick and muscular, enabling them to jump quickly and to considerable distances, which perhaps gave birth to the saying, "as lively as a cricket." The ovipositor is long and spear-shaped, and slightly curved upwards. Packard says that "the shrilling of the male is a sexual call, made by raising the fore wings and rubbing them on the hind wings. The noise is due to the peculiar structure of the fore wings, the middle portion of which forms, by its transparent elastic surface, on which there are but few veinlets, a resonant drum, increasing the volume of sound emitted by the rubbing of the *file* on the upper surface of the hind pair of wings. This file is the modified internal vein, the surface of which is greatly thickened, rounded and covered closely with fine teeth. In the females the wings are not thus modified, and they are silent."

The Mole-crickets (*Gryllotalpæ*) may be recognized by their powerful fore-feet, which somewhat resemble those of a mole, being short, stout and flattened and armed with tooth-like projections. They inhabit soft and moist earth in which they drive burrows resembling miniature mole runs. According to Packard, their eggs, from 300 to 400 in number, are laid in the spring in tough sacks in galleries. Only one species, *Gryllotalpa borealis*, Burm., is recorded from Canada, where it appears to be very rare.

"Mole-crickets avoid the light of day, and are active chiefly during the night. They live on the tender roots of plants, and in Europe, where they infest moist gardens and meadows, they often do great injury by burrowing under the turf and cutting off the roots of the grass, and by undermining and destroying, in this way, sometimes whole beds of cabbages, beans and flowers."—(Harris.)

Should our American species become sufficiently numerous to be injurious, they might perhaps be poisoned by scattering grated vegetables sprinkled with Paris green in the vicinity of their burrows.

The large black cricket so common in dry fields during the summer months is the *Gryllus neglectus*, Scud.; specimens in the larval condition may be found under stones as soon as the snow has melted in spring, and on warm sunny days may be observed running through the scanty herbage, making off with hasty jumps when alarmed. By the end of May most of them have attained the perfect condition, but some individuals are later, as I have taken a specimen in the pupa state on June 4th, 1885.

I have not been able to determine whether these hybernated specimens live until the end of the season, or deposit eggs during early summer and then die, but so far as I have observed, their shrilling almost entirely ceases during July. In the beginning of August a few may be heard, and by the middle of the month they are again in full chorus, appearing to be more numerous than in the earlier part of the season. Harris says, "The old insects, for the most part, die on the approach of cold weather; but a few survive the winter by sheltering themselves under stones, or in holes secure from the access of water." This may perhaps be the case in Massachusetts, where, I believe, Dr. Harris observed them; my own experience is that they hybernate as larvæ, that is, about half grown and without wings. About the end of August, and during September, the field crickets lay their eggs. At this time they leave their hiding places and may be seen in great numbers in the fields, particularly on dry hill sides, where the herbage is short and scanty. When about to deposit her eggs, the female walks slowly along, stopping at intervals and feeling the ground with her ovipositor; when a suitable spot is found, she raises her abdomen, inclining the ovipositor downwards until its point touches the earth, into which, by steady and continued pressure, it is gradually forced until completely buried, when the eggs are deposited.

Beside our native species of *Gryllus*, we have the well-known house cricket, *Gryllus domesticus*, which, like its cousins the cockroaches, has crossed the ocean.

This species loves warm quarters, making its home in kitchens and bakehouses feeding on crumbs and scraps, not being particular as to diet. During the day it hides

in chinks and crevices, coming out at night in search of food. It is of a greyish-white colour. marked with spots and lines of brown.

The small black crickets, so plentiful in meadows and pastures, belong to the genus *Nemobius*. They may be distinguished from the species of *Gryllus* by their smaller size, duller colours, and by the thorax or neck, being slightly hairy. These little crickets do not burrow in the earth like the larger kinds, although an occasional specimen may be found under stones or clods of earth. They are of social habits, keeping together in large troops or swarms. The striped cricket, *Nemobius vittatus*, Harris, is our most abundant species ; its colour is greyish-brown, marked with lines of black.

Another species of about the same size, but with long wings, may occasionally be found ; this is the little long-winged cricket, *Nemobius fasciatus*, DeGeer. It closely resembles the striped cricket, but the wings are about twice the length of the body. It flies well, and sometimes enters houses in the evening, attracted by the light. "Where crickets abound, they do great injury to vegetation, eating the most tender parts of plants, and even devouring roots and fruits whenever they can get them. Melons, squashes, and even potatoes, are often eaten by them, and the quantity of grass that they destroy must be great, from the immense numbers of these insects which are sometimes seen in our meadows and fields."—(Harris.)

Domestic fowls and turkeys will eat crickets and locusts whenever they can get them, and would considerably lessen their numbers if let run in the fields after the crop has been harvested. The broad-winged hawk (*Buteo Pennsylvanicus*) also feeds largely upon them in the fall, as I have on several occasions found them in their crops, one individual having its crop literally crammed with specimens of the common field cricket, (*Gryllus neglectus.*)

Crickets might be easily killed by simply crushing them under foot in the fall, as at this time they congregate in numbers in exposed situations for the purpose of depositing their eggs ; they might also be caught with nets by children and destroyed.

All the foregoing species live on the ground, but we have another kind of cricket which spends its life among the leaves and branches of tall weeds and shrubs. It is the ivory climbing cricket, *Œcanthus niveus*, Serv. The male is ivory white, with very broad, transparent wing-covers, crossed by from three to five oblique raised lines. In the female the wing-covers are longer and narrower, and of a pale green colour. The antennæ and legs are long and slender, the insect not being so stoutly built as the ground crickets. The shrilling of this species is more sustained than that of *Gryllus*, the notes running together like the roll of a drum, swelling and decreasing alternately. They commence shrilling about the first of August, and continue until the frosts of October put an end to their existence. This is a very troublesome insect to the fruit grower, attacking the peach, plum and other trees, being particularly injurious to the grape and raspberry. When about to deposit her eggs, the female settles herself on a grape stem or raspberry cane, and pierces it with her ovipositor, laying a long, narrow, yellow egg in the opening thus made, repeating the operation until from four to fifteen have been deposited.

The cane thus attacked often withers above the punctured part, or is so much weakened as to be easily broken off by the wind or by the weight of the leaves in spring, the result in either case being the loss of the fruit. Late in fall or early in spring search should be made for the punctured canes, which should be cut away and burned. The insects themselves may be killed by jarring them from the plants and crushing them under foot. Fences and waste-corners should be kept clean and free from wild vines and briars, such places being prolific breeding grounds of this and various other insect pests.

Family 2.—Locustidæ, (Grasshoppers.)

The term Grasshopper is now generally restricted to certain orthopterous insects with very long, slender legs and antennæ, mostly of a grass or leaf-green colour. In the winged species the wing-covers slope downwards at the sides of the body and overlap a little on the back near the thorax. The ovipositor is generally long and curved like a

cimeter. With few exceptions, grasshoppers are solitary insects, nor are they often sufficiently numerous to be injurious or attract attention. At the head of the family systematists place a group of wingless forms represented in Canada by two species—one restricted to the North-west, the other apparently common in Ontario and Quebec. The latter is the spotted, wingless grasshopper of Harris, *Ceuthophilus maculatus*. This curious insect lives in small communities under stones in damp woods and beneath the loose bark of dead trees. It is rather strongly built, with stout hind thighs ; its general colour is brown, thickly mottled with spots of a lighter colour ; the back is arched, and the creature has a smooth, shiny appearance as if varnished. It is entirely wingless, ovipositor rather long and nearly straight. It appears to be somewhat carnivorous, as I have taken it in cans baited with meat. The western insect is *Udeopsylla nigra*, Scud. It resembles in form the preceding species, but is heavier and stouter ; the ovipositor is rather short, and thick at the base. Colour, shining black.

The next group contains the typical insects of the family, the green grasshoppers or katydids. Most of these possess ample wings and can fly well. Some species live on trees and shrubs, while others inhabit meadows and pastures. They are pretty and harmless creatures, not being numerous enough to be injurious ; and owing to their retiring habits and the similarity of their colour to the leaves and grasses amidst which they live, are but seldom noticed even in the localities where they are most abundant.

"The shrilling of these insects is produced by friction of the large veins situated nearly on the inner margin of a talc-like plate at the base of the wing-covers. When the insect shrills, the wing-covers are raised and the bases shuffled together."—Riley. The shrilling of some of the southern species is quite powerful, and where the insects are very abundant the noise is sometimes unpleasantly loud ; but in these northern regions the notes of our grasshopper are weak, nor are the insects sufficiently numerous to attract much attention.

Our green grasshoppers may be divided into two groups, one containing the species that live on trees and shrubs, (the true Katydids) the other those species that live on the ground or in tufts of rank herbage (the meadow grasshoppers.)

Our commonest arboreal species is the narrow-winged Katydid, *Phaneroptera curvicauda*, De Geer. It may often be observed resting on shrubs and young trees during the latter part of summer, occasionally taking a short flight from tree to tree. It may be recognized by its narrow and straight wing-covers, and by the male having a cylindrical style curving from below upwards, and resting in the forks of a furcate appendage which projects from the end of the abdomen. The ovipositor of the female is rather short and curved abruptly upwards, the extremity being toothed on both sides. The female deposits her eggs in the edges of leaves, as discovered by Miss Murtfeldt. Prof. Riley describes the note of this species as a soft *zeep, zeep*, sometimes uttered singly, but generally thrice in succession.

While passing through its earlier stages this species wears a more varied dress than the simple green of the adult insect. In the *larvæ* the colours are purplish-black and white, arranged in minute squares on the head and body, the antennæ and legs being marked with rings of the same colours. The *pupa* is green, varied with purple on the sides, and adorned with a double row of crimson spots on the dorsal surface. The mature insect is wholly green. It may be found during August and September.

The Oblong-winged Katydid, *Phylloptera* (*Amblyconypha*) *oblongifolia*, De Geer, is green like the preceding species, but may be distinguished from it by its larger size, and by the oval form of its wing-covers. It appears to be rare in Canada. I have not seen any account of the earlier stages of this insect, but in the latter end of June, 1885, I found two larvæ which, I think, probably belonged to this species, as they were entirely pale green ; and on August 1st, 1885, I found two pupæ, also green (*curvicauda* is marked with purple and white when immature), and I know of no other arboreal species in eastern Canada.

The Broad-winged Katydid, *Platyphyllum concavum*, Harr, may be distinguished from our other species "by the greater length and convexity of the wing-covers, which

entirely enclose the abdomen, and with their strong midrib, look exceedingly like a leaf" Riley. This is the true "Katy-did," the name being derived from a fancied resemblance of the call of the male to the words, Katydid.

> "I sit among the leaves here, when evening zephyrs sigh,
> And those that listen to my voice I love to mystify;
> I never tell them all I know, altho' I'm often bid,
> I laugh at curiosity, and chirrup 'Katy did.'"

Prof. Riley states that "the stridulation is quite forcible, representing more often 'Katy-she-did' than 'Katy-did,' and continued at regular intervals."

Rare in Canada, and apparently confined to south-western Ontario.

These are the only aboreal species on our Canadian lists, and so far as known to me, they live altogether on trees and shrubs, never coming to the ground except by accident. Prof. Riley aptly remarks that "they might more appropriately be called tree-vaulters than grasshoppers."

In *Conocephalus* the head is conical, and extends to a point between the eyes, and the ovipositor is long and straight. *C. ensiger*, Harr, is the only species recorded from Canada. It is of a pale green colour, the head whitish, the abdomen and legs brownish green. It measures from an inch and three-quarters to two inches in length. The female has been observed by Prof. S. I. Smith, with its ovipositor forced down between the root-leaves and the stalk of a species of *Andropogon*, where the eggs are probably deposited.

During the latter part of summer, numbers of small, fragile looking green grasshoppers may be found in damp fields. They belong to the genus *Xiphidium*, of which we have two species in Canada, one of which, *X. fasciatum*, is common and generally distributed; the other, *X. saltans*, appears to be rare, and is apparently confined to the North-west. The species resemble each other very closely, their general colour being green, with a brown stripe on top of the head, and the thorax bordered on each side with darker brown. The ovipositor bends abruptly down at the base, and is then straight to the tip.

Prof. Riley states that *X. fasciatum* oviposits in the cone-like willow gall (*Salicis strobiloides*). Although *X. fasciatum* and its variety, *brevipennis*, are abundant at Montreal, I have not heard them shrilling; according to Mr. Scudder, "*Xiphidium* makes a note very similar to *Orchelimum*, but so faint as to be barely perceptible even when close at hand."

The species of *Orchelimum* are almost identical with *Xiphidium* in general appearance and colour, but are larger, measuring about an inch and one-tenth in length from head to tip of wing-covers. They also differ somewhat in habits, according to my observations, *Xiphidium* being generally distributed among the grass, while *Orchelimum* conceals itself in the ranker tufts. *Orchelimum agile*, De Geer, is common in the neighbourhood of Montreal, and may be found in almost every damp field where there are tufts of rank grass or clumps of tall weeds. Concealed in one of these the male takes his stand and trills his simple love song, which is merely a weak, wheezy trill, only audible for the distance of a few feet. When shrilling the insect slightly raises its wing-covers, and shuffles them together with a shivering motion. It shrills in the bright sunshine, and it was by observing the play of light on the wings while in motion that I discovered the insect, as when sitting still it is almost impossible to detect it, so effectually does its green dress conceal it.

The species of *Anabrus*, commonly called western crickets, are large, thick-bodied, clumsy looking insects, the wings being very small and quite useless for the purpose of flight. As the popular name implies, they are found in the west, where at times they occur in immense numbers, often proving very injurious. *A. purpurascens*, Uhler, is the only species on our Canadian lists. It is of a dark purplish-brown colour, mottled with yellow.

Family 3.—Acrididæ, (Locusts.)

This family contains the most destructive insects of the order ; indeed I may say, the most destructive of all insects, the terrible migratory locusts. Both the old and new worlds have time and again been scourged by their countless millions, well named by the eastern poet, "The army of the Great God." The desolation caused by their ravages has been the theme of poets and historians since the days of Pharoah's humiliation, when "they covered the face of the whole earth so that the land was darkened."

The noise made by the beating of their wings during flight has been compared to the rushing of a mighty wind, the roar of distant thunder, the crackling sound of burning stubble, etc., and is thus described by the poet Southey :—

> "Onward they came, a dark continuous cloud
> Of congregated myriads numberless,
> The rushing of whose wings was as the sound
> Of a broad river headlong in its course
> Plunged from a mountain summit, or the roar
> Of a wild ocean in the autumn storm
> Shattering its billows on a shore of rocks."

The *Acrididæ*, or Locusts, (Fig. 18) may be distinguished from the grasshoppers by the antennæ being short, not exceeding the body in length, and by the number of joints in the feet, the locusts having only three, the grasshoppers four. The wing-covers are generally long and narrow and slope downwards on the sides like a roof. The under wings are broadly triangular, and when at rest are folded in plaits like a fan. Instead of a long exserted ovipositor like the grasshoppers and crickets, the female locust is provided with four wedge-like pieces, placed in pairs above and below, and opening and shutting opposite to each other. When about to deposit her eggs the female forces these wedges into the earth, these being opened and withdrawn enlarge the opening ; the operation being repeated until a hole is formed large and deep enough to admit nearly the whole of the body.

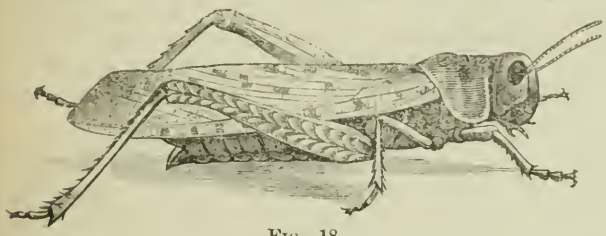


Fig. 18.

Prof. Riley thus describes the manner in which the Rocky Mountain locust (*Caloptenus spretus*) deposits her eggs. (Fig. 19 represents the different positions.) "The female, when about to lay her eggs, forces a hole in the ground by means of the two pairs of horny valves which open and shut at the tip of her abdomen, and which, from their peculiar structure, are admirably fitted for the purpose. With the valves closed she pushes the tips in the ground, and by a series of muscular efforts and the continued opening and shutting of the valves, she drills a hole until, in a few minutes (the time varying with the nature of the soil) the whole abdomen is buried, the tips reaching an inch or more below the surface by means of great distention. Now, with hind legs hoisted straight above the back and the shanks hugging more or less closely the thighs, she commences ovipositing, the eggs being voided in a pale, glistening and glutinous fluid which holds them together and binds them into a long, cylindrical pod, covered with particles of earth which adhere

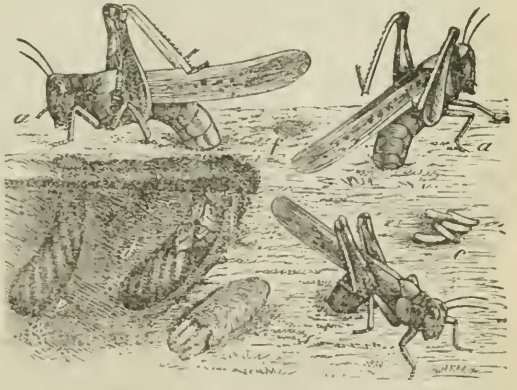


Fig. 19.

to it. When fresh the whole mass is soft and moist, but it soon acquires a firmer consistency. It is often as long as the abdomen, and usually lies in a curved or slanting position. The eggs which compose this mass are laid side by side to the number of from 30 to 100 according to the size of the mass."

Prof. Thomas states that he has obtained the eggs of *Caloptenus femur-rubrum* in rotten wood in which they were placed without any apparent regularity and without being connected by any glutinous secretion.

The sounds made by locusts are produced in two ways, first by rasping the hind thighs up and down on the wing-covers, and second by snapping together the edges of the w ngs and wing-covers during flight.

Our Canadian locusts fall into two sub-families, *Acridinæ* and *Tettiginæ*. To the first belong all those species in which the pronotum (upper surface of thorax) extends only to the base of the wing-covers. This group contains the greater number of our species. To the second belongs a small group of species in which the wing-covers are aborted, appearing as small pads, while the pronotum extends as far as, or past, the extremity of the abdomen.

As regards the time of appearance of our locusts, there is a succession of species from early spring until the fall. As soon as the snow has disappeared from the sunny slopes and grassy banks, several kinds of little locusts may be observed. These are the Grouse-locusts (*Tettix* and *Tettigidea*). They are compactly formed, the body being broadest between the middle pair of legs, tapering gradually to a point behind, the head is very small and the legs are rather short. As already stated, the wing-covers are merely little scales, the wings being folded beneath the extended thorax. The species are all small, measuring about half an inch in length. They pass through their transformations during the latter part of summer and fall, hybernating in the imago or perfect state.

About the end of May and during the month of June a species of locust may often be observed flying with a rustling sound. This is *Tragocephala infuscata*, Harr. There are two forms or varieties. The typical *infuscata* being dusky brown, the wing-covers faintly spotted with brown, wings transparent, pale greenish-yellow next the body, with a large dusky cloud near the hind margin, and a black line near the front margin ; length about three-quarters of an inch. The variety *viridi-fasciata* is almost wholly green and is slightly larger ; it has been described as a distinct species, but as it occurs in the same localities and at the same season it is probably merely a variety of the same species. They hybernate as larvæ, changing to pupæ early in spring, attaining the perfect state about the end of May and disappearing early in July. Dr. Harris states that they "are sometimes very troublesome in gardens, living upon the leaves of vegetables and flowers, and attacking the buds and half-expanded petals."

As *infuscata* dies out, its place is filled by swarms of *Camnula pellucida*, a small locust very abundant in dry pastures during midsummer. General colour ash-brown, face reddish brown, a dark spot behind the eye and just touching it, and another on the side of thorax, wing-covers brown, marked with yellow lines and dark spots, wings colourless, with black veins. The female measures about an inch in length, the male a little less. The flight of this species is noiseless, extending about thirty or forty feet.

During August and September the fields fairly swarm with locusts, prominent among them being the large species that fly with a crackling or snapping noise. Many of these insects have considerable command of themselves while on the wing, being able to change the direction of their flight at will. The wings are generally brightly colored, reminding us of the lepidopterous genus *Catocala*.

Œdipoda verruculata is ash-brown varied with dusky brown, wings yellow at base with a black band.

Œdipoda sordida flies with a rustling noise exactly like the species of *Tragocephala*. It is dusky brown, head and thorax varied with patches of lighter and darker shades, wing-covers dark brown with two light bands on the middle portion. Wings pale greenish yellow on the inner half, remainder smoky brown. *Œdipoda carolina* is our largest species, the female measuring from 1.5 to 1.75 inches. It is of a dull ash-brown colour, sprinkled with small dusky spots, wings deep black, except the margin, which is pale yellow. When alarmed it flies with a muffled, rustling noise.

Œdipoda phœnicoptera is light brown, spotted with dark brown on the wing-covers, wings coral red with a dusky border. This is a vernal species, flying with a loud, snapping noise as soon as the snow is off the ground.

b

Fig. 20.

Our most abundant and troublesome species in the older Provinces is the common red-legged locust, *Caloptenus femur-rubrum*, (Fig. 20), which, during some years, multiplies to such an extent as to seriously injure the hay and other crops.

The Entomologist to the Department of Agriculture in his report for 1885 quotes Mr. J. Scriver, M.P., as follows :—"Grasshoppers were numerous and very destructive in certain localities. In the month of August our pastures were swarming with them, and they afterwards attacked the oats also. They did much injury by biting off the separate flowers just as they came out of the sheath, sometimes destroying the whole panicle. Their ravages were most severe in the townships of Hemmingford and Havelock, and particularly in the parish of Lacolle, where one farmer had to cut down his oats and use them for fodder. The species referred to was the common red-legged locust, *Caloptenus femur-rubrum*."

During 1885 locusts were very numerous all through the country, and several milkmen told me that they had seriously injured their pastures. At Lachine I observed that in many places the shrubs and young trees growing by the fences were almost stripped of leaves by them, presenting a ragged appearance. The species that I found up in the shrubs were the red-legged locust, *Caloptenus femur-rubrum*, and the yellow striped locust, *Caloptenus femoratus*. The latter is a large, clumsy-looking species, easily recognized by having two yellow stripes running from the head to the end of the wing-covers. It is a common species and very troublesome in gardens.

The destructive Rocky Mountain locust, *Caloptenus spretus*, Uhler, (Fig. 21), is almost identical with our commonest red-legged species, but has longer wings, and in the male the end of the abdomen is turned up like the prow of a ship. For a full account of this species, the reader is referred to the Rev. C. J. S. Bethune's valuable paper in the Society's Reports for 1874-75. By the middle of October nearly all our locusts have disappeared, but a few specimens of *Caloptenus* and *Stenobothrus* linger until the autumnal frosts put an end to their existence.

a

Fig. 21.

The ravages of our common locusts might be greatly lessened by beating them with bundles of brush, and thus driving them into hollows or against fences. When thus congregated, they could be killed by beating them with shovels or by gathering into sacks and boiling down for hogs. The best time for this work would be the end of June and beginning of July, as at this time our most injurious kinds have not acquired wings, moreover, they are now mostly in the pastures and can be destroyed without injuring the standing crops. Dr. Harris states that in the south of France "the locusts are taken by means of a piece of stout cloth, carried by four persons, two of whom draw it rapidly along, so that the edge may sweep over the surface of the soil, and the two others hold up the cloth behind at an angle of forty-five degrees. This contrivance seems to operate somewhat like a horse-rake, in gathering the insects into windrows or heaps, from which they are speedily transferred to large sacks."

Family 4.—Phasmidæ, (Walking-Sticks or Spectres).

This family is represented in Canada by only one species, the well-known Walking-stick insect, *Diapheromera femoratum*, Say.

This curious creature is entirely wingless, and looks very like a small twig. It lives almost altogether on trees, on the leaves of which it feeds, being found most frequently on oak and basswood. According to Packard, the egg-sac is flattened, elliptical, with a lid in front which can be pushed open by the embryo when about to hatch, and is deposited in the autumn. With us it is seldom numerous, but some few years ago it

increased enormously in parts of New Jersey, New York and Maine, stripping acres of trees, leaving them as bare as in midwinter, and congregating in heaps by the fences, showing that what is usually a scarce and harmless insect may, under favourable conditions, increase to such an extent as to be seriously injurious.

Family 5.—Blattidæ, (Cockroaches).

Cockroaches are flattened, ovate insects, generally of a dull brown colour, and have an oily and disagreeable smell. They run swiftly, but do not jump like the crickets and locusts. The eggs are laid in a bean-shaped capsule, divided into two compartments, each containing a row of separate chambers, each of which encloses an egg. Some days are required for oviposition, and the female may be seen running about with the egg-case partially protruding from the body. The egg-case is dropped at random, the female not depositing or concealing it in any particular place or manner.

Cockroaches are omnivorous insects, feeding on almost everything eatable, whether animal or vegetable, some species being great pests in houses. The kinds found in our dwellings have been carried here in shipping, and are now common in almost every part of the world.

The large black species so familiar to housewives, under the name of "The Black Beetle," is the *Blatta* (*Stylophyga*) *orientalis*, Linn. As the name implies, it is an eastern species, brought to us by commerce. During summer it sometimes takes up temporary quarters in the open air, as I once found a flourishing colony under some stones in a lane in the rear of a bakehouse.

The other important species is the small reddish-brown cockroach, *Ectobia Germanica*, commonly known in the New England States as the "Croton Bug." It infests houses, and is even more troublesome than the large species, making itself at home in wooden partitions and cracks in furniture, soon becoming unpleasantly numerous. It is not so strictly nocturnal in its habits as the large species, and may often be seen on a voyage of discovery in broad daylight.

Our native species live under stones and beneath the loose bark of dead trees, and appear to be rare insects.

Family 6.—Forficulidæ, (Earwigs).

Earwigs may be distinguished from all other Orthoptera, by their narrow, flattened body and short wing covers, and by the extremity of the abdomen being furnished with a forceps, which in some species equals the body in length.

This instrument appears to be used for several purposes. Westwood says "they are weapons of offence and defence." De Geer states "that they are used during sexual intercourse." The Rev. J. G. Wood says "the membranous wings of the earwig are truly beautiful. They are thin and delicate to a degree, very large and rounded, and during the day-time packed in the most admirable manner under the little square elytra. The process of packing is very beautiful, being greatly assisted by the forceps on the tail, which are directed by the creature with wonderful precision, and used as deftly as if they were fingers and directed by eyes."

Dr. John G. Morris's experience does not agree with the Rev. Mr. Wood's account. He says, "last summer I had a good opportunity of observing the habits of this insect, for every night numbers of them came into my study window in the country, and lighted very conveniently upon the table at which I was writing. Each one of them, before he took flight, for they were active, would bend his body back and lift up the short elytra with his forceps before the wings would expand, and this they did invariably. The forceps were not used to fold the semi-circular wings, but only to elevate the wing-covers before flying."

These accounts may perhaps be reconciled upon the assumption that the forceps is not used for the same purpose by every species. The smaller species of *Staphylinidæ*, for which a small earwig would be easily mistaken while on the wing, may very often be

observed tucking in their wings with the aid of the long flexible abdomen, but I do not remember ever seeing the larger species doing so.

The female earwig is remarkable for the care with which she watches over her eggs and young, sitting upon them like a brooding hen, a fact vouched for by Kirby and other eminent entomologists.

During the day, earwigs generally hide in holes and crevices, often concealing themselves among the petals of flowers, the long spur of the nasturtium being a favourite place of refuge. A few of the smallar species are active during the day, flying about in the sunshine. Earwigs feed on vegetable matter, and in Europe, where they are numerous, often do much damage by eating the blossoms of carnations, dahlias, etc. In this country they appear to be rare insects, only one species being recorded from Canada, the *Labia minor* of Linnæus, common to both Europe and America.

So far as known to me, none of the Orthoptera occurring in Canada are double-brooded, with perhaps the exception of *Gryllus*, and of course, those species which infest houses. Of *Gryllus*, some individuals at least, go through their transformations in spring, appearing as larvæ in April, and being in full song by the end of May. The species of *Tragocephala*, which go through their transformations at the same time, are all dead by the end of July, and during this month the crickets if not dead are nearly, if not altogether silent, but in August appear again, and in much greater numbers, while *Tragocephala* is not seen until the return of spring.

With regard to the species found in houses, winter is unknown to them, the result being a constant succession of broods, which accounts for the short time required for stocking a kitchen with cockroaches.

PRELIMINARY LIST OF CANADIAN ORTHOPTERA.

Gryllidæ.

Gryllotalpa borealis, Burm.—Very rare. A pair taken in Essex County, Ont.—Brodie.

Gryllus luctuosus, Serv.—Rare. Two females in August; Montreal.—Caulfield.

Gryllus neglectus, Scudder.—Province of Quebec, very common—Provancher; Montreal, abundant—Caulfield; Toronto, very abundant—Brodie.

Gryllus domesticus, Oliv.—Quebec, common — Provancher; Montreal, common—Caulfield; Ottawa, rare—Fletcher; Toronto, rare—Brodie.

Nemobius vittatus, Harris.—Quebec, common — Provancher; Montreal, common—Caulfield; Ottawa—Fletcher; Toronto, common—Brodie.

Nemobius fasciatus, De Geer.—Quebec, Provancher; Montreal, not common—Caulfield; Ottawa—Fletcher; Toronto—Brodie.

Nemobius (Anexipha) septentrionalis, Scudder.—Quebec, one specimen—Provancher; Rat Portage—Brodie.

Œcanthus niveus, Serv.—West Farnham, P.Q.—Provancher; St. Hyacinthe, P.Q.—Provancher; Montreal, abundant—Caulfield; Ottawa—Harrington; Toronto—Brodie; London—Saunders. Ent. Reports.

Locustidæ.

Ceuthophilus maculatus, Harris.—Anticosti—Verrill; Quebec, common—Provancher; Montreal, common—Caulfield; Ottawa, common—Fletcher; Ontario, generally to north of Lake Superior—Brodie.

Udeopsylla nigra, Scudder.—Common in Manitoba—Scudder and Brodie.

Phaneroptera curvicauda, De Geer.—Province of Quebec, common in August and September—Provancher; Montreal, common—Caulfield; Ottawa, common—Fletcher; Toronto, common in Ontario generally, to north of Lake Superior—Brodie; Red River

Settlements—Scudder; a male, Rosseau River, August 30th, and a female in the vicinity of Souris River—G. M. Dawson.

Phylloptera (Amblycorypha) oblongifolia, De Geer. — Montreal, rare — Caulfield; Ottawa, common—Fletcher; Toronto, common, and Ontario generally, to north of Lake Superior—Brodie; Regina, N.W.T., one specimen—Fletcher.

Platyphyllum concavum, Harris.—London, taken at electric light—W. E. Saunders.

Conocephalus ensiger, Harris.—Toronto, common—Brodie; London—L. Reed.

Xiphidium fasciatum, De Geer.—Province of Quebec, common—Provancher; Montreal, common—Caulfield; Ottawa, very common — Fletcher; Toronto, common, and Ontario generally, to north of Lake Superior—Brodie; Var. *brevipennis*—Scudder, common in same localities.

Xiphidium saltans, Scudder.—Souris River—G. M. Dawson.

Orchelimum vulgare, Harris.—Toronto, common; Ontario everywhere—Brodie.

Orchelimum agile, De Geer.—Montreal, common—Caulfield; Ottawa, rather uncommon—Fletcher; Toronto—common; Ontario generally, to north of Lake Superior—Brodie.

Anabrus purpurascens, Uhl.—Common on the prairies around Regina—Fletcher; West Butte, July 29th; in the vicinity of Woody Mountain, between June 15 and July 7th, and in the neighbourhood of Souris River—G. M. Dawson.

Acrididæ.

Chloëaltis conspersa, Harris.—Rat Portage, Man.—Brodie; eastern shore of Lake Winnipeg, five specimens—Scudder; Nepigon—Fletcher.

Chloëaltis (Amblytropidia) subhyalina, Scudder.—Province of Quebec—Provancher.

Stenobothrus curtipennis, Harris—Quebec—Provancher; Montreal, common—Caulfield; Ottawa—Harrington; Ontario generally, to north of Lake Superior.—Brodie.

Stenobothrus propinquans, Scudder.—Cap Rouge, Quebec—Provancher.

Arcyptera lineata, Scudder.—Province of Quebec—Provancher.

Gomphocerus brunneus, Thomas.—Regina, August 12th, 1887—Fletcher.

Gomphocerus clepsydra, Scudder.—Souris River—G. M. Dawson.

Tragocephala infuscata, Harris.—Quebec, common—Provancher; Montreal, common—Caulfied; Ottawa, uncommon—Fletcher; Ontario, generally to north of Lake Superior—Brodie.

Tragocephala Var. *viridifasciata*, Harr.—Same distribution.

Arphia sulphurea, Fabr.—Quebec, very rare—Provancher; Ottawa, common—Fletcher; Toronto, common, and Ontario generally, on sand hills—Brodie.

Arphia tenebrosa, Scudder.—Sudbury, Ont., Regina and Nepigon—Fletcher; Souris—G. M. Dawson.

Arphia sanguinaria?—Regina, August—Fletcher.

Arphia frigida, Scudder.—Taken near Wood End in June—G. M. Dawson.

Arphia trifasciata, Say.—Wood End in June—G. M. Dawson.

Spharagemon collaris, Scudder.—Regina, abundant, August, 1886—Fletcher.

Spharagemon æqualis, Say.—Red River settlements—Scudder.

Trimerotropis verruculata, Kirby.—Quebec, common—Provancher; Montreal, common—Caulfield; Ottawa—Fletcher.

Encoptolophus sordidus, Burm.—Quebec, very common—Provancher; Montreal, common—Caulfield.

Dissosteira carolina, Linn.—Quebec—Provancher; Montreal, common; Ontario, generally to Lake Superior—Brodie; Vancouver Island—Packard.

Hippiscus phœnicoptera, Germ.—Quebec, common—Provancher; Montreal, rare—Caulfield; Toronto, rare—Brodie; Nepigon, common, July 7th, 1887—Fletcher; Dufferin, June 13th and 14th—G. M. Dawson.

Camnula pellucida, Scudder.—Province of Quebec—Provancher; Montreal, common—Caulfield; Regina, Fletcher.

Camnula atrox, Scudder.—Regina, August—Fletcher; Victoria, Vancouver Island—Packard. (Surely a variety of the preceding.)

Pezotettix borealis, Scudder.—A single pair, vicinity of Lake of the Woods—G. M. Dawson.

Pezotettix Dawsonii, Scudder.—Souris River—G. M. Dawson.

Pezotettix septentrionalis, Sauss.—Labrador—Saussure.

Melanoplus repletus, Walk.—Vancouver Island—Walk.

Melanoplus scriptus, Walk—Vancouver Island—Walk.

Melanoplus bilituratus, Walk.—Souris River—G. M. Dawson; Vancouver Island—Walk.

Melanoplus femur-rubrum, Burm.—Quebec—Provancher; Montreal, common—Caulfield; Ottawa—Harrington; Ontario, generally to north of Lake Superior—Brodie.

Melanoplus atlantis, Riley.—Quebec—Provancher; Ottawa—Fletcher.

Melanoplus spretus, Uhler.—Dufferin, Souris River, vicinity of the Lake of the Woods, and the east fork of Milk River—G. M. Dawson.

Melanoplus parvus, Prov.—Cap Rouge, Quebec—Provancher.

Melanoplus femoratus, Burm.—Quebec—Provancher; Montreal—Caulfield; Ontario, everywhere—Brodie; Lake of the Woods—G. M. Dawson; Regina—Fletcher.

Melanoplus Packardii.—Regina, one specimen—Fletcher.

Melanoplus infantilis.—Regina—Fletcher.

Melanoplus extremus, Walk.—Arctic America—Walk.

Melanoplus fasciatus, Walk.—St. Martin's Falls, Albany River, Hudson Bay—Walker.

Melanoplus arcticus, Walk.—Arctic America—Walk.

Melanoplus borealis, Feiber.—Labrador—Feiber.

Acridium appendiculum, Uhler.—Quebec—Provancher.

Tettix granulata, Kirby.—Quebec—Provancher; Montreal, common—Caulfield; Ottawa—Harrington; Ontario, generally to Lake Superior—Brodie; Arctic America—Kirby; Vancouver Island—Packard.

Tettix ornata, Say.—Quebec, common—Provancher; Ontario generally, rare—Brodie.

Tettix cucullata, Scudder.—Toronto, common; Ontario generally, rare—Brodie.

Tettix triangularis, Scudder.—Quebec, rare—Provancher; Montreal, rare—Caulfield; Ottawa—Harrington; Ontario, generally to Lake Superior—Brodie.

Tettix rugosa, Scudder.—Sudbury, Ont.—Fletcher.

Tettigidea lateralis, Say.—Quebec—Provancher; Montreal—Caulfield; Ottawa—Harrington; Ontario, generally to Lake Superior—Brodie.

Tettigidea polymorpha, Burm.—Common in same localities as preceding species.

Tettigidea acadica, Scudder.—Lake of the Woods—G. M. Dawson.

Batrachidea cristata, Harris.—Toronto, rare—Brodie.

Phasmidæ.

Diapheromera femoratum, Say.—Montreal, not uncommon—Caulfield; Ottawa—Fletcher, Harrington; rare in Hickory Woods; Kingston—Rodgers; Ontario generally—Brodie; Red River settlements—Scudder.

Blattidæ.

Stylophyga orientalis, Linn.—Quebec—Provancher; Montreal, common—Caulfield Toronto—Brodie.

Ectobia Germanica, Stephens.—Chaudiere curve, Quebec—Fyles; Montreal, common—Caulfield; Toronto—Brodie.

Ectobia lithophila, Harris.—Welland and westward—Brodie.

Periplaneta Americana, Linn.—Essex County, Ont.—Brodie.

Ischnoptera Pennsylvanica, De Geer.—Montreal, one specimen; Abbotsford, P.Q., three specimens under bark of stumps—Caulfield.

Temnopteryx marginata.—Montreal, two specimens under bark of dead tree—Caulfield.

FORFICULIDÆ.

Labia minor, Linn.—Cap Rouge and Port Neuf, three specimens—Provancher; Montreal, one specimen at light—Caulfield; Ottawa, one specimen—Harrington; three specimens at light,—Fletcher.

A CHAPTER ON THE STRUCTURE OF BUTTERFLIES AND MOTHS.

BY A. R. GROTE, A.M.

The Lepidoptera, or Butterflies and Moths, form a natural suborder of six-footed insects (*Insecta hexapoda*), characterized by possessing (save in the case of a few species of moths in which the females are wingless or have the wings aborted), two pair of membranous wings, attached to the sides of the thorax and covered, usually completely, sometimes only partially with scales of various shapes, overlapping each other somewhat

FIG. 22.

like shingles on a roof. The body consists of chitinous or horny rings and is divided into three principal parts by deeper and wider sutures: head in which the rings have become fused, thorax and abdomen in which they are distinct. As we now find them the *Lepidoptera* fall into two principal divisions, the one the true butterflies (*Rhopalocera*), Fig. 22., which fly by day, the other, the moths (*Heterocera*), Fig. 23, which fly chiefly by night. In addition to the scaly wings, the two divisions or groups have several characteristics in common which divide them from other insects. In their younger stages they appear as caterpillars, Fig. 25, having three pair of true or jointed thoracic legs, and this seems to be invariable except in one or two genera of minute leaf-mining moths. In addition they have between 2 and 5 pair of fleshy abdominal or false feet, unjointed and discarded in the pupal and perfect stages. A few genera want these false feet and many have only two pair, so that in

FIG. 23.

crawling, they bend themselves in the shape of a loop or arch in bringing the false and true feet together, (Fig. 26). The silk spinning caterpillars often aid their progression by letting themselves drop from one branch of a tree to another by means of a thread spun from the mouth. The body of the caterpillar consists of a head, three thoracic segments and nine abdominal. Except in a very few cases, they feed on plants and bite

Fig. 26.

their food by means of two powerful mandibles or jaws, covering the opening of the mouth at the sides. The mouth is further protected above by two corneous pieces forming the upper lip which is used to hold the food fast. The substance forming the covering of the head is hard and horny and often darker coloured than the rest of the body, which is usually quite or almost naked, though frequently covered more or less completely with hair, and ornamented with wart-like tubercles, the hairs themselves being gathered into bunches of various lengths and colours, (Fig. 27). The caterpillars are most often of various shades of green and brown, like the leaves on which they feed and the earth into which many enter to form the pupa; but not a few are grayish, like the bark of the trees upon which they often crawl, while their colouring is almost always clearly protective and aids their concealment from their enemies. Not a few are internal feeders, living on the pith or wood, and these are maggotty in appearance, pale yellowish or flesh colour, with dark heads, thus resembling the larvæ of beetles which inhabit similar localities. A few are called "Sack-bearers" from their living in a portable case made of silk and twigs and bits of leaves, (Fig. 28). The caterpillars of the *Tineidæ* frequently form mines on the leaves, eating out the green and fleshy part of the leaf and leaving the transparent pellicle as a protection. The pupa or chrysalis of butterflies and moths is quiescent, covered with a horny skin, with the segments variously impressed or provided

Fig. 25.

Fig. 27.

with spines, and allowing the parts of the perfect insect to be perceived. In some kinds

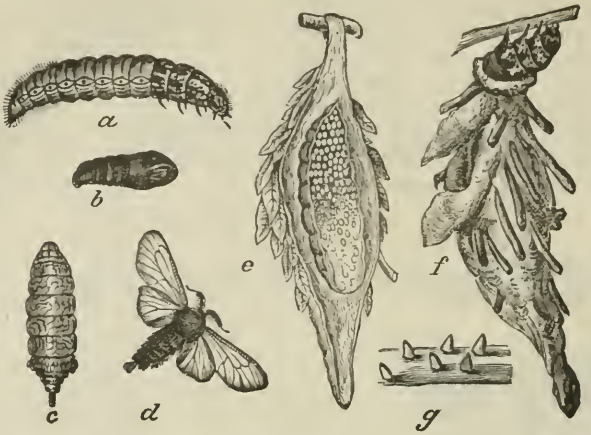


Fig. 28.

the abdomen is moveable and this character is oftenest seen in the moths, in which the chrysalis is mostly protected by a cocoon, (Fig. 29), of varying shape, thickness and construction. In the butterflies the chrysalis is

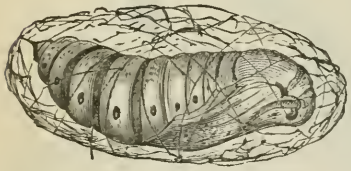


Fig. 29.

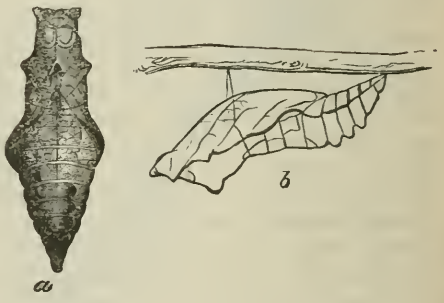


Fig. 30.

usually naked, (Fig. 30*a*), and variously fastened to some object, either hanging from a little button of silk head downward, (Fig. 31*j*), or with the addition of a girdle, (Fig. 30*b*), when the position is reversed, while sometimes the caterpillar enters on its transformation without protection of any kind (Fig. 32), except what is adventitious and accidental upon the surface of the ground. The Hawk Moths or *Sphingidæ*, generally penetrate the earth itself, transforming into the pupa in a cell formed simply by the movement of the body packing the clay together. The wood-borers form a cocoon with the aid of bits of the wood itself variously and curiously wedged together. All these statements are made from my own observations.

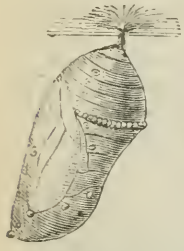


Fig. 31.

Fig. 32.

In the perfect state butterflies and moths agree in the coiled-up tongue, by means of which food is taken up in a liquid state by the insect. Many moths have the mouth

parts aborted, and consequently take no nourishment as perfect insects, their life being correspondingly brief. This spiral tongue consists of the elongated soldered maxillæ; the mandibles or jaws of the larva becoming rudimentary in the perfect state. The sub-equal wings consist of a membrane traversed by a simple system of nerves or veins, the neuration, covered with scales and fringed with hair. The thorax has a distinct portion in front, the collar (*collare*). The abdomen usually tapers posteriorly, in some females it appears blunt, being provided with heavy tufts, the hairs from which are used sometimes as a nesting for the eggs. As caterpillars, the Lepidoptera usually feed and grow, whereas as butterflies and moths they occupy their brief lives chiefly in propagating their kind, the sexes being separate and the females laying eggs, singly or in patches or clusters, from which again caterpillars emerge. To this latter there are a few exceptions. In the case of some Spinners and the Tineid genus *Solenobia*, a parthenogetic race has been observed, the virgin females laying eggs which produce only females, no males being hatched, the complete species is only produced by a union of the sexes. What are called "Hermaphrodites" are also sometimes found, in which, in one and the same individual, the two sexes are variably united, one side being more or less completely male, the other female. This is seen occasionally in the larger spinners, *Platysamia Cecropia* and *Callosamia Promethea*, when the division is clearly marked by the sexual differences in the antennæ and colour. Such specimens are abnormal productions and infertile, not true Hermaphrodites as the snails normally are. Bastards, resulting from the union of two species, occur, and have been noticed, especially in the hawk moths, but I have never seen an undoubted example of this kind myself. By confining the perfect insects, bastards have been artificially produced; in nature they seem to occur rarely. New species are probably never formed in this way of unnatural selection.

The three divisions of the lepidopterous body mark also a division of function. The *head* is provided with jointed appendages for the purpose of holding, biting and masticating the food, or sucking the same in the perfect state, and here the sense-organs, eyes, ocelli and antennæ are situated. The three-ringed *thorax* supports three pairs of slender legs and the wings—the organs of locomotion. The nine-ringed *abdomen* contains the digestive and reproductive parts; breathing or the aëration of the blood is accomplished by stigmata opening on the sides of the body, chiefly the abdomen. In the butterflies those forms are highest in rank in which the front pair of legs are useless for walking, being apparently taken out of the locomotive series, curiously shortened and elevated, and seem like an additional pair of palpi or head organs. The interesting details of the anatomy of the head by my kind friend, Mr. Edward Burgess, should be known by students.

For the essential characters separating the butterflies and moths, I refer more particularly to a paper of mine read before the American Association for the Advancement of Science in August, 1873, the gist of which I here reproduce with fuller statements. There is first to be noted the differences in the structure of the antennæ. These usually long, jointed, thread-like organs, situated on each side of the vertex, are quite uniform in shape throughout the butterflies, being more or less club-shaped or thickened at the tips. From this latter character the name *Rhopalocera* has been given to them by Dr. Boisduval. On the other hand, the moths have the antennæ of quite various shapes and length, usually showing some sexual difference in structure. The *position* of these organs in the two divisions exhibits a marked change. In the butterflies the antennæ are comparatively rigid and straight, and are directed upwards and forwards. In the moths the antennæ are flexible and held horizontally, being not unfrequently deflexed along the sides of the body in repose. The antennæ are apparently less used by the butterflies, which depend more on their sight during their diurnal activity. That they are the organs of smell and are probably also sensitive to vibrations of the air, has been suggested by experiments. The feathered antennæ of so many male moths seem to be sensitive to odours given out by the female. In this way the fact is accounted for, that male moths will come long distances to find unerringly specimens of the opposite sex. One needs only to expose a freshly-hatched female of our larger spinners, even in the heart of the city, to verify this statement. The moths, resting in the daytime, seem also to depend on their antennæ to warn

them of the approach of danger, as they are sensitive when touched, and the jarring of the surface on which the moth rests is probably first communicated to the antennæ, which lie parallel with the plane of repose. The wings are deflexed in the majority of the moths (Fig. 33) when in repose, and clapped together and held upright in the butterflies. In the *Hesperidæ*, the lowest butterflies, the front pair of wings are often alone elevated when the insect is sitting or walking, the hind pair being flatly extended as in many moths, particularly the Spanners. Certain moths sometimes elevate the wings when resting, as the larger Bombyces, and many *Geometridæ* do the same when walking. The butterflies want the frenulum, or bristle and hook, which connect the front and hind wings in the majority of moths, and hold them together when flying. As a whole, the nervures are stouter and the wings perhaps stronger in the butterflies. The hawk moths have the wings, however, very strongly built, narrow and with thick ribs; their flight is correspondingly rapid and extended. The body is more thinly scaled in the butterflies, becoming more hairy and tufted in the moths, in which the total vestiture is looser and longer, more downy and somewhat easier abraded. In the butterflies the scales are more complicated in structure and the wings themselves are, on the whole, more equal-sized and with shorter fringes. The legs of the moths are, as a rule, stronger, being often curiously armed and spined. Dr. Boisduval called the moths *Heterocera*, or diversely-horned, in contradistinction to the butterflies, and these terms probably signalize an important difference or degree in the use of the antennæ in the two divisions of Lepidoptera.

Fig. 33.

The writings of Mr. S. H. Scudder afford us some insight into the ancestry of existing Lepidoptera. In particular, he has called attention to the fact that all the diverse patterns which adorn the wings have originated from shaded bands or lines which run parallel with the outer margin, and have become broken up into spots of such varied form as to make it strange that they should have come from so simple an element. (Fig. 34.)

Fig. 34.

It is evident, however, that this is the correct view. I had previously shown that the ringed spots of the wing in the *Noctuidæ* originated from loopings of the usual transverse lines. There seems to be a correlation between the length of tongue in the Lepidoptera and the corolla of flowers. It is probable that the butterflies came in with the flowering plants and that they were preceded in point of time by moths which had short maxillæ and simply hairy, unscaled wings, unicolorous or faintly banded, and having their parentage in the ancient Neuroptera or dragonflies. These may have had aquatic larvæ and less complete transformations, active in the darkness; living, indeed, at an epoch when the light of the sun was less potent at the surface of the earth than it is at the present day.

A study of the *head* of the perfect moth shows that it is composed of several distinct chitinous pieces protecting the nervous ganglia, and covering the mouth parts which are only fitted to take in liquid food. At the base of the spiral tongue (*spirilingua*) are placed the jointed *maxillary palpi*, (Fig. 35) but these are often, perhaps usually obsolete; they are well developed in the snout moths or *Pyralidæ*, and especially in certain *Tineidæ*. On the other hand all moths possess one pair of *labial palpi*, jointed appendanges, analogous to the legs in ultimate structure and articulated to the lower lip or labium. The space between the eyes is called the *front* or *clypeus*, and this piece varies in comparative shape and size in the different families, and often affords peculiar structure offering generic characters. In the genus *Eudryas*, for example, (Fig. 36) it is smooth, and in the related genus *Copidryas* it is provided with a clypeal horn. The compound eyes vary in shape and external appearance. They are sometimes constricted, as in certain Heliothid genera in the Owlet moths. Again the surface, usually naked, is covered with short hairs arising from the angles of the facets apparently, and only to be properly observed under the microscope. Behind the eyes the small ocelli, or simple eyes, are to be found; these are never more than two in number, and are sometimes wanting, as in the genus *Brephos*. The *antennæ*, or "feelers," are situated on the top of the head on each side, and spring out between the vertex and epicranium. The basal joint is often thickened and longer than the rest. Up to 100 joints have been counted in the antennæ of some moths. They vary much in ultimate structure and exhibit sexual peculiarities,

Fig. 35.

Fig. 36.

Fig. 37.

being more prominent in the males, feathered, pectinated or ornamented with nodosities. The extremes in total length are apparently afforded by the genera *Adela*, where they are longest and *Hepialus* where they are shortest. They are broadest and most plumose in the genus *Attacus* (Fig. 37.) The average aspect of these organs in the moths may be

found in the *Noctuidæ* where they are bristled beneath, scaled above, and about two-thirds the length of the fore wings.

The thorax supports the organs of locomotion, the legs and wings. The former are six in number and consist of five joints. They are attached to the thorax by the basal joint or *coxa*, and there is a small piece, the *trochanter*, between this and the *femur*, which is stouter than the following *tibia*, the leg terminating in jointed toes or *tarsi*. The *tibiæ* are often armed with spines or prickles, while the fore pair terminate sometimes in claws at the sides. In addition the middle and hind legs bear a pair of *spurs*. When the thorax is denuded of its vestiture it is seen to consist of three principal divisions, *prothorax*, *mesothorax* and *metathorax*, of which the middle piece is the largest. The wings are four in number, and are attached usually in the moths by a bristle and hook; the former is divided in the females and simple in the males, and is situated on the hind wings beneath near the upper edge of the wing; the bristle fits into a sort of socket on the under surface of the fore wings near the base. This character is wanting in the butterflies and in some moths, and seems to be an aid in keeping the wings together when flying. According to the system originally proposed by Dr. Herrich-Schaeffer, the ribs or nervures of the wing are numbered from one on, commencing on the inner margin of each wing. The marginal nervure is wanting, and the subcostal and median nervures form a median cell and branch out into secondary veinlets thrown on the costa and external margin. An accessory cell is sometimes formed beyond the median cell, but the median cell is often open, and there are, as a rule, no cross veins on the wing. The submedian vein or nervure is usually simple. The interspaces between the nervures are also indicated in descriptions so that the markings may be more accurately located. The fore wings are, according to this system, 9 to 12 veined, the number depending on the secondary veins which afford generic characters. The hind wings are similar in structure to the fore wings. They also vary in the number of secondary veins, of which there are usually 7 to 8. These veins are in reality hollow rods through which, when the insect escapes from the chrysalis, air and blood are forced by an action of the muscles of the thorax. They finally become dry and rigid. The wings in insects are thus not analogous to the wings of birds; they are outgrowths of the tracheal system and have only a common function with the wings of vertebrate animals. In order to study the neuration of Lepidoptera the wing must be denuded of scales. This is most easily accomplished by a process invented by Mr. George Dimmock by which the coloring matter is removed from the scales. For this process the wing, previously moistened with ether to remove all fatty matter, is placed in a solution of chloride of lime. From this it may be transferred from time to time to a weak solution of acid to hasten the action of the lime water which, in a short time, decolorizes the scales, rendering them entirely transparent and allowing the course of the veins to be exactly made out. Wings prepared in this manner may be transferred to glass slides and mounted for the microscope.

A study of the wings and external parts of the Lepidoptera leads to the conclusion that the genera are founded on comparative characters. Rarely does the presence of a peculiar structure of some of the organs give a strong character to the genus. The conclusions, with regard to classification, to which I have arrived are, that the generic characters must be dealt with in principle as are those separating the individuals into species. The limits of the genera depend on the want of intermediate forms, the important point being that the combination of characters which constitute the genus shall be readily seizable by the student and verifiable. Nature seems to be concerned with the individual rather than with our divisions, which are to a certain extent arbitrary and matters of convenience for our better understanding of these organisms.

Subordinate to structure in the moths are the pattern of ornamentation and coloration. The former is of the most value in associating species, although the latter is very characteristic in the different groups. In the butterflies we see for instance that the *Satyridæ*, or Meadow Browns, are of a dusky gray or blackish brown color, shading to reddish or yellow, while the wings are usually ornamented with eye-like spots. The *Pieridæ* are usually white, yellow or orange of various shades with black margin to the

wings (Fig. 38 *Pieris protodice*, male; Fig. 39, female); the *Papilionidæ* (Fig. 40) are also oftenest black and yellow and adorned with stripes. (See Fig. 22.) The *Hesperidæ*

Fig. 38.

Fig. 39.

are dark yellow and brown, the brighter ground color broken into blotches. In the moths the spinners (Fig. 41) are usually of rich and bright reds and yellows, with transverse bands of darker shades; while the Owlet moths (Fig. 42) are oftenest of obscure

Fig. 40.

tints, certain groups which frequent flowers being brighter colored. In fact the colours of butterflies and moths alike seem to be protective and also dependent on the environment of the species; they have all gradually grown to be what they are to-day, from the total

Fig. 41.

Fig. 42.

effect of the environment upon the species, and interesting facts are being worked out by naturalists from time to time all bearing upon the great question of the derivation and descent of the Lepidoptera. The interaction of flowers and insects forms a fascinating chapter of modern science.

The habits of butterflies and moths can be best observed in a vivarium, their quick flight rendering them difficult objects for free observation, but their lives are so short and

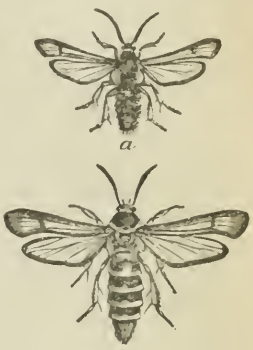
simple that beyond the observations of their various attitudes and the way in which they lay their eggs and provide for their young there is not much to be said about them. The sun is the powerful motor for the butterflies, which, during very dark days or during an eclipse, become sluggish and behave as at nightfall. The moths, per contra, are most active during cloudy nights, loving the darkness and avoiding the moonlight. The habits of the caterpillars are varied by the situation in which they are found. Well deserving of close study are the aquatic larvæ of *Arzama*, *Sphida* among the *Noctuidæ* and *Hydrocampa* among the Pyralids, the latter furnished with thread-like gills for water breathing. The enthusiasm with which entomology is pursued when we are young carries with it a success in our observations which is not counterbalanced by the experience that comes with time. *Quant 'e bella giovinezza*—Lured to be up at five in the morning to catch the moths in their first sleep in the dawn on tree trunks and palings before the birds had disturbed them, finding thus early many freshly disclosed rarities and being amply rewarded for my rising. Caterpillars are also easier found at dawn, before or soon after sunrise. Everything that is beautiful passes with youth, before we have learned to remember, and our experiences are all new and unblunted.

The necessity of exercising our discriminative faculties makes the study of the habits and structure of these insects a useful one to the mind by enlarging its faculties and, if properly guided, helps one to a kindly philosophy and the enjoyment of unselfish pleasures. But entomology, like every other pursuit, is only the frame upon which our moral character is extended and displayed.

Most interesting is the study of *Variation* in the butterflies and moths. We have first to consider the seasonal varieties, where a difference in the different, spring, summer, broods is shown. Then the sexual varieties, peculiar to one sex, as in *Ennomos alniaria*, where, according to Dr. Packard, we have two kinds of males, etc. Then dimorphic varieties, as for instance *Hemaris uniformis*, which is, on the authority of Mr. Hulst, apparently a constantly recurring form in both sexes of *H. Thysbe*. It is not always possible to decide of any two forms which is the variety and which the parent, or original form of the species. The practice of considering the first form that was described as the original form and the latter the variety, is too unscientific to merit consideration. We have then *Aberrations*, mostly individual in character, in which by suffusion of color, or substitution of one tint for another, also by a change from the normal markings, a departure from the usual form is signalized. The cause of variation is evidently complex. Edwards, Dorfmeister, Weismann, have all shown the influence of cold and temperature in producing varieties. Warmth and light, the geological formation, food-plants, in fact, all the physical environments are, in truth, the factors, but it is not always easy to say which is the determining force. While varieties are considered to be nascent species it is probable that this is only relatively true and that a species may produce, under certain conditions, a variety which has insufficient character to become a species. Light and heat are supposed to produce brighter colours. Natural selection fixes the specific character, hardening it into constancy. The butterflies are gaudier than the moths and most brilliant at the Tropics. The day-flying moths are higher colored, as a rule, than the strictly nocturnal species, which are as dusky as the night during which they range. An objection to this is, that the circumstances under which the caterpillar exists can alone be determining upon the colours of the moth. It is thought that the food-plant influences colour, and that the pigments are made by the chemical processes within the body itself. But the colours of the moth are also directly affected, as I have long shown. I am inclined to believe that the moths are a survival of the oldest form of the Lepidoptera. That their colours are inherited, and that formerly all the Lepidoptera were dusky and active in the night or when, during the whole twenty-four hours, the light was less powerful on the surface of the globe than it is now. The influence of the surroundings of a moth upon its color may be witnessed in the case of *Hemileuca tricolor*, a pallid, desert-inhabiting form of a black genus of Bombyces. This moth is, as I have shown, a true *Hemileuca*, differing only in colour from other species of the genus. I have alluded elsewhere to the method of variation by which the under surface of the wings in the moths which are concealed from the light are the least affected. The fact that the under surface of primaries often corresponds with upper

surface of secondaries, as if the pattern of one were photographed upon the other, is deserving of especial notice in this particular. All shadows are photographs which may deepen with time.

Among tropical butterflies *Mimicry*, as illustrated by Bates, Wallace, Fritz Müller, Darwin, plays an important part. The fact that certain species (*Ituna*, *Euplœa*) are protected by a peculiar smell from their natural enemies, seems to have induced a variation in other Lepidoptera not so protected, by which they approach in colour, pattern the protected species and are so preserved. But not only do the Lepidoptera mimic each other, but also other orders of insects and natural objects such as leaves and sticks, the bark of trees, etc. It may be assumed as a general principle that any variation in a direction which would protect the species would be preserved, although it is difficult to think out the steps in such a process. The fact that throughout nature form is conditioned by environment covers such general resemblances as caterpillars to stalks and butterflies to the leaves of plants. It is only when we take animals out of their usual surrounding that they afford contrasts and strike the eye. The resemblances of the *Sesiidæ*, or Clear Wings, to wasps has been often noted (Fig. 43). We have a species in our Fauna, *Sciapteron simulans*, in which this resemblance is carried to a startling extent. I was much struck by the way in which an Orthopterous insect, living on the leaves of garden Okra, which I observed near Savannah, copied the beetle *Tetracha Virginica*. A special enumeration of the cases of protective mimicry already well ascertained would alone fill a large volume.



a *b*

Fig. 43.

The mass of living forms of butterflies and moths must be regarded as the descendants of original fewer and simple types. The probability that the Lepidoptera root in the *Neuroptera*, is assisted by the known transformation of the mouth parts and the survival of genera with decidedly neuropterous habit, structure, form. Fritz Müller, whose researches are worthy of our most sincere admiration, has traced the resemblances between the *Phryganidæ* and the *Lepidoptera*. Speyer considers the *Psychidæ* and *Tineidæ* the nearest to the *Neuroptera*, and Packard's early studies on the structure of the thorax in *Hepialus* have shown how near existing types of these two suborders of insects approach each other. No doubt in *Hepialus* and *Cossus* we have ancient types surviving; many years ago I read a paper trying to show that our primitive *Lepidoptera* had aquatic larvæ (like *Arzama* yet retains), and less perfect transformations. I differ with Butler as to *Cossus*, not being able to consider it structurally as allied either to *Castnia* or *Sphinx*, but as more directly representing a low or old type from which the spinners were, later on, derived. An outgrowth of a primitive unsightly structure, the Lepidoptera now fill the world with beauty and add to the pleasures of mankind. Life, always transforming itself, perishing to appear in new shapes, is the *perpetuum mobile* of the universe. It is certainly not to be proved that this will ever disappear if we leave out of sight the speculations as to the extinguishing of the sun, which are perhaps more curious than probable. It is a condition of our minds that we imagine a necessary end to all things. Nature, in fact, ends every instant only to transform—bearing children and devouring them. It is our poetical idealization of Nature which makes life supportable to thinking minds. We answer the unanswerable questions, whence, whither, wherefore, of our existence by a poetical apotheosis, or a scheme of usefulness. But when we lay these toys of the mind aside, the misery and faithlessness is only too real. To perish, and to perish in such company! Nor does the materialistic selfishness and insincerity of the present century console us! At a time when more than ever the principles of Christianity are needed, Christianity is going out. Almost do we prefer the intellectual swindle of the last century to what we now suffer. Money rules the world, and the commercial balance sheet is waited for; not the spring and the new year. Everybody asks me, Does your Entomology, your Art, pay? How much do you get by it? I have even been suspected of using it merely to make money by it, which, in one sense, complimented me. But

mainly those who deal in humbug, claptrap, and lies, make money, in Entomology as in other things. If you are poor and have only your good reputation, it is a proof that you have kept yourself reasonably unspotted from a world of deceit and fraud, a world which, in the past at least, has rewarded the betrayer, the successful perjurer, and martyred every human heart that beat for it, ridiculed and oppressed every intellect that opposed reason to its unreason and folly. In every circle of society and activity, the same story of suffering and wrong is wearisomely repeated. Still, hope remains behind and has not flown even out of our Entomological boxes. Thus I wander from my subject, I hope not altogether aimlessly.

The relationship between the butterflies and moths and the flora of any region is so intimate a one, that a word may be said in closing this chapter upon the structure of the larvæ which feed mostly upon plants. The mandibles or jaws of the caterpillars are very powerful machines for biting the food transversely. Especially are the muscles attached to the jaws developed in the *Sesiidæ* and wood-feeding Bombyces and Noctuids. The pith of currant bushes and elder is fed upon by several caterpillars, and these internal feeders look like the larvæ of beetles, but may be distinguished among other characters by their abdominal feet. The *Cossinæ* feed internally on poplar, willow, oak and locust, and prodigious strength is required to tunnel these hard wooded trees. The way in which the cocoon of Bailey's goat moth (*Cossus Centerensis*) is formed out of splinters of the wood has been interestingly described by Dr. Bailey, and at first sight it is wonderful how the moth forces itself through the end of the cocoon, which seems to have no, or little, silk, and finds the open air. That it is through mechanical means that all cocoon makers escape, seems probable, and in *Telea Polyphemus* a hooklet has been discovered at the base of forewings used in cutting or tearing the silk. The "secretive fluid" theory seems to be now rejected. I have never seen any "secretive fluid" escaping by the mouth and used to soften the threads. The cocoons are protective and probably bad conductors, thus ensuring the safety of the chrysalis during heavy frosts. The first chrysalids were probably formed under water, beneath stones or in the stems of water plants. That the silk is usually brown and resembles the bark of trees is owing to "protective" origin, while all cocoons soon "weather"; the rain and sun take out the bright surface lines and the cocoon soon comes to look more and more like the surface on which it is formed. The white patches on the cocoon of Platysamia Columbia look like the patches on the bark of the larch. The fields and woods conceal numbers of insects from predatory birds and animals, bringing a percentage through all dangers. The enemies of insects are so numerous that very slight changes, one must think, would act beneficially upon the preservation of the species. The woods, probably, are more protective than the fields, but the interior of woods seem also the most deserted by insects. The sunlight is probably beneficial, and forces the caterpillars and butterflies and moths into exposed conditions. The tendency to multiply excessively, which the Lepidoptera show, must be kept within bounds, or the balance of Nature would soon become seriously threatened. In every way the adaptation of the insect in its different stages to its total environment is very perceptible and interesting to study. I have shown that the caterpillars of certain Lepidoptera are very plainly independently influenced to variation, the perfect insects being much less affected. Larval variation has probably played the most important part in the formation of the species of *Datana*, etc. I have called such generic assemblages where the contained forms are very close, apparently just separating into "species" by the name "progenera." Throughout the life of the butterfly or moth modifying agencies are active and, though the frail individual easily perishes at the least unfriendly pressure, yet the species is none the less surely affected by a continued force applied in any given direction under natural conditions.

(No. 22).

Copy of an Order in Council, approving of certain regulations respecting the Education Department. (*Not printed.*)

(No. 23).

Copy of an Order in Council, raising the High School at the Town of Chatham to the status of a Collegiate Institute. (*No printed.*)

COPY OF ORDER IN COUNCIL,

Approving of Schedules of particulars respecting Certain Indentures of Agreement entered into by the Minister of Education with certain Publishers in regard to Printing, Publishing and Selling Text-Books.

Presented to the Legislative Assembly,

By Command,

ARTHUR S. HARDY,
Secretary.

Provincial Secretary's Office,
Toronto, 30th January, 1888.

COPY

OF AN ORDER IN COUNCIL APPROVED BY HIS HONOUR THE LIEUTENANT-GOVERNOR, THE 17TH DAY OF DECEMBER, A.D. 1887.

Upon the recommendation of the Honourable the Minister of Education, the Committee of Council advise that Your Honour approve of the annexed Schedules of particulars of certain Indentures of Agreement, per attached form, entered into by the Minister of Education, acting for the Department of Education of Ontario, with certain publishers in regard to printing, publishing and selling text-books, authorised per minute of the Education Department, dated 21st September, 1887.

Certified, J. LONSDALE CAPRÉOL,
Asst. Clerk Executive Council,
Ontario.

Book.	Publishers.	Particulars.
Public School Arithmetic.	Canada Publishing Company (Limited), Toronto.	For use of Public Schools; forms I.-IV. Indenture dated 24th June, 1887; size of book 7¼ in. by 4⅞ in.; 184 pp. exclusive of end papers and covers; maximum price, 25 cents per copy; usual discount provided for. Any other publisher may publish at any time after 1st September, 1888; royalty 10 per cent.; copyright transferred to Education Department; usual particulars as to paper, printing, binding, etc.
Public School Geography.	Canada Publishing Company (Limited), Toronto.	For use of Public Schools; forms I.-IV. Indenture dated 24th June, 1887; size 9⅝ in. by 7⅞ in.; 164 pp.; maximum price, 75 cents per copy; usual discount provided for. Any other publisher may publish after 1st September, 1888; royalty 10 per cent.; copyright to be transferred to Education Department; usual particulars as to paper, printing, binding, bond, etc.
Kindergarten Drawing Course, Parts I. and II.	Selby & Company, Toronto.	For use in Public Schools; forms I.-II. Indenture dated 4th July, 1887; size of book 7½ in. by 9½ in.; 24 pp. exclusive of covers; maximum price per part, 10 cents; usual discount provided for. Any other publisher may publish after 1st September, 1888; royalty 10 per cent.; copyright transferred to Education Department; usual particulars as to paper, printing, stitching, bond, etc.
Public School Grammar and Elements of Composition.	Canada Publishing Company (Limited), Toronto.	For use in Public Schools; forms I.-IV. Indenture dated 24th June, 1887; size of book 7¼ in. by 4⅞ in.; 184 pp. exclusive of end papers and covers; maximum price, 25 cents per copy; usual discount provided for. Any other publisher may publish after 1st September, 1888; royalty 10 per cent.; copyright transferred to Education Department; usual particulars as to paper, printing, binding, bonds, etc.
Public School Temperance.	The Grip Printing & Publishing Company, Toronto.	For use in Public and High Schools; indenture dated 9th September, 1887; size of book 7¼ in. by 4⅞ in., inside measurement; 130 pp. exclusive of end papers and covers; maximum price, 25 cents per copy; usual discounts provided for. Any other publisher may publish after 1st September, 1888; royalty 10 per cent.; copyright transferred to Education Department; usual particulars as to paper, printing, binding, bonds, etc.

TEXT BOOKS—*Continued.*

BOOK.	PUBLISHERS.	PARTICULARS.
The Public School Music Reader.	Canada Publishing Company (Limited), Toronto.	For use in Public Schools; forms I.-IV.; indenture dated 9th September, 1887; size of book 6½ in. by 7½ in.; 115 pp. exclusive of end papers and covers; maximum price, 40 cents per copy; usual discounts provided for. Any other publisher may publish after 1st September, 1888; royalty 10 per cent.; copyright transferred to Education Department; usual particulars as to paper, printing, binding, bonds, etc.
The High School Reader.	Rose Publishing Company, Toronto.	For use in High Schools and Collegiate Institutes: forms I.-IV. Indenture dated 27th January, 1886; size of book, same as Fourth Reader, Ontario Series; 448 pp,. exclusive of end papers and covers; maximum price, 60 cents per copy; usual discounts provided for; paragraph 16 of indenture not to apply; Education Department shall not, for one year from date of authorization, authorize any other publisher to publish said Reader; publisher to keep on hand a sufficient number of copies to supply all demands of the public and trade after 1st July, 1886; publisher to deliver on or before 1st July, 1886, a complete set of electrotypes of said book of first class quality; copyright vested in Education Department.
High School English Word Book.	The Copp, Clark Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of book, uniform with Ontario Readers; 347 pp., exclusive of end papers and covers; maximum price, 50 cents per copy; usual discounts provided for; any other publisher to have right to publish after one year from date of transfer of copyright; copyright to be transferred to Education Department when copyright of other High School books is secured.
Ayres & Armstrong's Orthoëpist.	Canada Publishing Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of book, 4 in. by 5¾ in.; 224 pp., exclusive of end paper and covers; maximum price, 35 cents per copy; usual discounts provided for; any other publisher to have right to publish after one year from date of transfer of copyright to Education Department; royalty 10 per cent.; copyright vested in Education Department; usual particulars as to paper printing, binding, bonds, etc.
High School Grammar.	Canada Publishing Company (Limited), Toronto.	For use of High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of book, 7 in. by 4¾ in.; 416 pp., exclusive of end papers and covers; maximum price 75 cents per copy; usual discounts provided for; any other publisher to have right to publish after one year from date of transfer of copyright; copyright to be transferred to Education Department when copyright of other High School books is secured.
High School Composition, Williams.	Canada Publishing Company (Limited), Toronto.	Same as in High School Grammar, except that the book shall contain 222 pp., exclusive of end papers and covers, and that the maximum retail price shall be 50 cents.
Ayres and Armstrongs's Verbalist.	Canada Publishing Company (Limited), Toronto.	Same as for the Orthoëpist, except that the book shall consist o 254 pp. instead of 224 pp.
High School Geography.	Canada Publishing Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; other particulars the same as for the Public School Geography, except that the book shall contain 195 pp.; the maximum retail price shall be $1; copyright to be transferred to Education Department when copyright of other High School books is secured.

TEXT BOOKS—*Continued.*

BOOK.	PUBLISHERS.	PARTICULARS.
McLellan's Elements of Algebra.	Canada Publishing Company (Limited), Toronto.	Same as High School Grammar, except that the book shall contain 328 pp.
Robertson and Birchard's High School Algebra.	The Methodist Book and Publishing House (Wm. Briggs, Book Steward), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of book, 7¼ in. by 5 in.; 338 pp., exclusive of end papers and covers; maximum price, 75 cents per copy; usual discounts and particulars of printing, etc., provided for; any other publisher to have the right to publish after one year from date of transfer of copyright to the Education Department; royalty 10 per cent.; copyright to be transferred to Education Department when copyright of other High School books is secured.
High School German Grammar.	The Copp, Clark Company, (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; to be authorized if found suitable; indenture dated 4th July, 1887; size of book to be uniform with Ontario Readers; maximum price, 75 cents per copy; usual discounts and particulars of printing, etc., provided for; any other publisher to have the right to publish after one year from date of transfer of copyright to Education Department; royalty 10 per cent.; copyright to be transferred to Education Department when copyright of other High School books is secured.
High School German Reader (Grimm-Kinder) and Hans-Marchen).	The Copp, Clark Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of book, uniform with Ontario Readers; 200 pp., exclusive of end papers and covers; maximum price, 75 cents per copy; usual discounts and particulars as to printing, binding, bond, etc., provided for; any other publisher to have right to publish at any time after one year from date of transfer of copyright to Education Department; royalty 10 per cent.; copyright to be transferred to Education Department when copyright of other High School books is secured.
High School Zoology.	The Copp, Clark Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; to be authorized in August, 1888, if found suitable; other particulars as in case of High School German Grammar.
High School Chemistry, Knight.	The Copp, Clark Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; particulars the same as in case of High School Word Book, except that the book shall contain 300 pp., exclusive of end papers and covers, and shall sell at the maximum retail price of 75 cents.
High School Book-keeping and Precis writing, MacLean.	The Copp, Clark Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; particulars the same as for the High School Chemistry, except that the book shall contain 214 pp., exclusive of end papers and covers, and that the maximum price shall be 65 cents per copy.
The Standard Book-keeping & Precis Writing, Beatty & Clare.	W. J. Gage & Co., Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 8th December, 1887; size of book, 7⅝ in. by 5 in.; 240 pp., exclusive of title page, end papers and covers; maximum price, 65 cents per copy; usual discounts and particulars as to printing, etc., provided for; any other publisher to have right to publish at any time after one year from date of transfer of copyright to Education Department; royalty 10 per cent.; copyright to be transferred to Education Department when copyright of other High School books is secured.

TEXT BOOKS—*Concluded.*

BOOK.	PUBLISHERS.	PARTICULARS.
The High School Drawing Course, Five Parts.	The Grip Printing & Publishing Company, Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of each number, 7¾ in by 9¾ in.; 34 pp. in each part; maximum retail price, each part 20 cents; usual discounts and particulars of printing, etc., provided for; any other publisher to have right to publish at any time after one year from date of transfer of copyright to Education Department; royalty 10 per cent.; copyright to be transferred to Education Department when copyright of other High School books is secured
McGuirl's Perspective and Geometrical Drawing.	The Methodist Book and Publishing House (William Briggs, Book Steward), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 4th July, 1887; size of book, 7 in. by 4⅞ in.; 135 pp.; maximum retail price, 40 cents per copy; usual discounts and particulars of printing, etc., provided for; any other publisher to have right to publish at any time after one year from date of transfer of copyright to Education Department; royalty 10 per cent.; copyright to be transferred to Education Department when copyright of other High School books is secured.
The High School Music Reader.	The Canada Publishing Company (Limited), Toronto.	For use in High Schools and Collegiate Institutes; forms I.-IV.; indenture dated 9th Sept., 1887; size of book, 6½ in. by 7½ in.; 232 pp., exclusive of end papers and covers; maximum retail price, 75 cents; usual discounts and particulars of printing, etc., provided for; any other publisher to have right to publish after 1st Sept., 1888; royalty 10 per cent.; copyright vested in Education Department.
dwin's Art of School Management (Canadian Edition).	Warwick & Sons, Toronto.	For use in Normal and Model Schools (Training Schools); indenture dated 24th March, 1887; size of book, 4⅞ in. by 7⅛ in.; 237 pp., exclusive of title page, end papers and covers; maximum price, 75 cents per copy; usual discounts and particulars as to printing, etc., provided for; any publisher to have right to publish at any time after 1st Sept., 1888; royalty 10 per cent.; copyright assigned to Education Department.
oughton's Physical Culture.	Warwick & Sons, Toronto.	For use in Normal and Model Schools (Training Schools); indenture dated 24th March, 1887; size of book, 4⅞ in. by 7⅛ in.; 277 pp., exclusive of title page, end papers and covers; maximum price, 50 cents per copy; usual discounts and particulars of printing, etc., provided for; any publisher to have right to publish after 1st Sept., 1888; royalty 10 per cent.; copyright assigned to Education Department.

THIS INDENTURE made in duplicate this day of in the year of our Lord one thousand eight hundred and

BETWEEN

hereinafter called the Publisher *of the First Part,*

AND

Her Majesty the Queen, represented herein by the Honorable the Minister of Education for the Province of Ontario, acting for the Education Department of Ontario,

of the Second Part

Whereas, the Publisher ha made application to the Education Department of the Province of Ontario for the right to print and publish for use in Public and High Schools of Ontario.

And Whereas, the said Department of Education has approved of such application, and has agreed to grant the said Publisher the right to print and publish the said hereinafter called the Book, subject to the covenants and conditions hereinafter contained, and to the terms and conditions of the Regulations in that behalf of the said Department of Education.

Now, Therefore, this Indenture Witnesseth, that in consideration of the premises and of the sum of One Dollar of lawful money of Canada, the receipt whereof is hereby acknowledged, the said Publisher do hereby covenant with Her Majesty the Queen, her successors and assigns in manner following, that is to say :

1. That the Publisher shall from time to time and at all times observe, perform and fulfil in respect of the said book each and every of the terms and conditions of the Regulations of the said Education Department respecting the printing and publication of text books, and also the terms and conditions hereinafter contained, and that each and every copy of each and every edition of the said book for use in the Province of Ontario shall in every particular be printed and published by the Publisher in strict conformity therewith.

2. And that the Publisher shall submit or cause to be submitted to the said Education Department sample copies of each and every edition of the said book to be hereafter printed and published, for sale or use in the Province of Ontario, for the approval of such Department as to the mechanical execution of the presswork, binding and all other mechanical parts of the work, and that without such approval having been first had and obtained, no copy of any edition thereof shall be sold or disposed of for use in the said Province of Ontario. And furthermore, in order to avoid causing any loss to the said Publisher arising from, or liable to arise from, any edition of the said book not being approved of by the Education Department, owing to any serious defect or defects in any edition, and on that account condemned by the Education Department, and forbidden to be sold or issued to the schools or to the public, and also to more effectually protect the public, the said Publisher shall submit or cause to be submitted to the Education Department for examination sample sheets of the different forms of the book about to be printed, and specimens of the ink, paper, millboard, strawboard, cloth, mull, tapes, and other material proposed to be used by said Publisher in the printing and construction of the said book, together with a statement of the prices, weight, size, and other particulars necessary to judge of the relative quality of the different materials used or proposed to be used ; and the approval of the Education Department shall, before any work is proceeded with, be obtained in regard to the quality of the printing, and of the paper, and other material proposed to be used. And furthermore, after sanction has been given to the using of such material, or of such printing, presswork and binding, two sample copies at least of the book shall be submitted by said Publisher bound and finished in all respects *as proposed to be issued* by the said Publisher , and that without such approval first had and obtained, no work in regard to binding said book shall be proceeded with.

3. And that the paper to be used in each and every edition of the said book, and every copy thereof for use in the Province of Ontario shall be equal in quality to the sample prescribed by the said Education Department, to wit, of good quality, pounds to the ream of 500 sheets, measuring inches by inches of good color and texture, and super-calendered, or of such increased weight and improved quality as may be required by the Education Department, provided the cost of the same shall not exceed the cost of the sample herein prescribed, and no inferior quality of paper shall under any pretext whatsoever be used. The presswork and ink shall be first-class throughout, and shall be such as to produce, together with the plates, a clear and distinct impression ; and the stitching and binding of each and every edition of the said book, and the material used therein shall be equal to the sample submitted to and approved of by the Education Department as aforesaid. To be full bound in cloth embossed, on first and last pages. Sections to be pages each, and each section to be to three tapes or strings ; stitches and tapes on back of books to be covered with fine, strong, evenly-made mull, extending to within one-half inch from

top and bottom of books, and overlapping one inch on each side ; over the mull a strong piece of paper or pressing to be glued. Both tapes and strings and mull to be glued to covers. End papers to be pasted on separately from first and last sections, and to be that used in books. Cloth for covers to be extra finished, twilled, heavy, . Each and every part of the binding to be thoroughly done and durable. The maximum price not to exceed , and to be stamped on the cover, and no departure from such specification shall be made without the sanction of the Education Department. And no copy of the said book which does not in all particulars comply with the foregoing provisions in regard to paper, presswork, typography, ink and binding shall be sold or disposed of for use in the Province of Ontario.

4. And that the said sample copies to be furnished as hereinbefore provided for shall remain on file in the said Education Department, and each and every copy of each and every edition published, shall in all respects be equal to the sample copy so furnished to and on file in the said Department.

5. And that in case the Minister of Education points out to the said Publisher any defect or defects in the sample copies furnished to the said Department as aforesaid, but not deemed by him of sufficient importance to cause him to withhold his approval from such edition, then in such case the said Publisher shall in the next following edition or issue to that in which said defect shall have been pointed out, correct the same to the satisfaction of the said Department. but in case serious defects are pointed out by the Minister of Education to the Publisher in any edition published by said Publisher , and in case such edition is condemned by the Minister of Education as unfit for use in the schools or for sale to the public, the condemned edition shall be withdrawn from sale for use in the Province of Ontario, and shall. if required by the Minister of Education, be delivered by the said Publisher into custody of the Education Department, unless an arrangement satisfactory to the Minister be made for culling out any defective portion or portions, or the matter is in some other way adjusted.

6. And that the said book shall be of the size following, that is to say :

And that the said book shall be sold at retail prices not exceeding the following :

7. And that in order it may be the more easily recognized and ascertained that each and every copy of each and every edition of the said book to be published and in use in the said Province of Ontario is not only authorized but approved as to its mechanical execution, contents, and otherwise. by the said Education Department, the Publisher shall cause to be printed upon the title page of each and every copy of each and every edition of the said book the name of the firm by which such book is published, and the words "*Authorized by the Education Department for Ontario*," or words to that effect, or shall place upon the title page or cover of each copy of the said book the official stamp of the Education Department.

8. And that the retail price of each and every copy of each and every edition of the said book shall be printed on the cover or title page thereof. No advertisements of any kind shall appear in any of the said books, or upon the covers of the said books, except such as are approved by the Education Department.

9. And that for the better securing the retail sale of the said book at a price not exceeding that above set forth as the maximum retail price, the Publisher shall make the sale to any purchaser buying quantities of such book of one dozen and upwards at one time at prices at least per cent. lower than the said prescribed retail prices on the usual terms of sale, and that to purchasers of the said book in lots of the said value of dollars, computed at the said *retail* prices, the said Publisher shall make a further reduction of per cent. in the price thereof, and in lots of the sale value of dollars, computed at the said *retail* prices, the said Publisher shall make a further reduction of per cent. in the price thereof, and that

the said Publisher shall and will from time to time and at all times keep on hand a sufficient quantity of copies of the said book to supply all demands of the public and trade therefor.

10. And that the Minister of Education, or any person by him appointed, in writing for that purpose, shall and may from time to time and at any time during business hours enter the warehouse and all other business premises or any part thereof of the Publisher , for the purpose of inspecting any and every edition or issue of such authorized book and every copy thereof, and shall have a right to take sample sheets or other samples of material or sample copies of said books for the purpose of examination, whenever he thinks proper so to do.

11. And that in case the said Education Department shall at any time consider that the retail price heretofore mentioned of the said book should be reduced, the Minister of Education and said Publisher may arrange, at the option of the Minister of Education, a reduced retail price and scale of discounts, or the Minister of Education shall appoint an arbitrator, the Publisher shall appoint another, and the Chancellor of Ontario upon the application of the Minister of Education or of the Publisher , or the joint application of all parties hereto, shall appoint a third, and in case the Publisher shall for ten days after having been notified in writing of the appointment of an arbitrator by the Minister of Education omit to appoint an arbitratar, or to notify the Minister of Education in writing of the appointment, then the Chancellor of Ontario may name two arbitrators to act with the arbitrator appointed by the Minister of Education ; and the Publisher shall at any time and at all times when called upon so to do by the arbitrators or any two of them furnish the arbitrators with a detailed statement showing the cost of production and the returns of the sales of any or all copies of the said book, and shall in addition if so requested furnish the said arbitrators or any two of them for inspection all the vouchers and books which in any way refer to or contain any entry concerning the cost of production and returns of the sales of the said book, and that if it shall be deemed by the said arbitrators or any two of them that an excessive profit is being made by the said Publisher upon the sale of the said book the retail prices of the same shall be reduced to amounts which the said arbitrators or any two of them shall deem sufficient to yield a reasonable profit to the said parties, and such arbitrators or any two of them shall upon such appointment have full power to consider the question or questions submitted to them and to examine all statements, vouchers and books furnished by the said parties, and full power to compel the production of such additional statements, vouchers and books to those furnished by the said parties, and the evidence of any kind whatsoever which they shall deem necessary, with power to examine witnesses upon oath, and their decision in the premises or that of any two of them when given in writing shall be conclusive and binding upon the parties hereto, and the retail price or prices so fixed shall thenceforward govern the price or prices by the dozen and other wholesale prices as hereinbefore provided for. Provided that the change in prices aforesaid shall not take effect until six months after notice has been given for the appointment of arbitrators as aforesaid, and provided also that the expenses of such arbitration shall be borne by the Education Department.

12. And that the said Publisher will not print or publish, nor cause or authorize to be printed or published, nor be in any way accessory to the printing or publishing of any edition or copy or copies of the said book in the United States or anywhere else without the limits of the Province of Ontario, to be sold within the said Province of Ontario.

13. And that the Publisher shall not in any way, without the consent in writing of the Minister of Education acting on behalf of the Education Department, assign any right conferred upon such Publisher by this agreement.

14. And that should any difference of opinion arise between the parties hereto as to the construction to be put upon any of the terms, conditions and agreements herein contained, the same shall, if he consents to determine the same, be determined by the Chancellor of Ontario, after giving the parties hereto an opportunity of presenting their views, in person or by counsel, or if the said Chancellor decline to determine such

difference, then at the option of either of the parties hereto, and on the conditions herein contained, such matters of difference shall be determined by one of the Judges of the Superior Courts, and such determination by the said Chancellor or Judge shall be final and conclusive and binding upon the parties to this Indenture.

15. And that upon the Minister of Education giving to the said parties six months' notice, the Education Department may require the alteration of the contents of the said book, and may alter any of the specifications hereinbefore contained, providing the publishing is not thereby made more expensive; but that no change shall be made by the Publisher in the contents of the said book, nor any addition thereto, nor any omission therefrom, nor any notes or appendices thereto, nor any other change in the subject matter thereof, without the consent in writing of the said Education Department first had and obtained. The notice hereinbefore provided for may be given by publication thereof in two issues of any newspaper published in the City of Toronto and in the *Ontario Gazette*.

16. And that the publisher successor or assign shall have for year from the day of in the year of our Lord One thousand eight hundred and eighty the sole right to print and publish within the said Province of Ontario, and Dominion of Canada, the said book.

Provided always, however, that any other publisher shall have the right of publication at any time, by permission to be obtained from the Department of Education for Ontario, subject to a royalty of per cent. on the retail price, as at first issued or afterwards reduced, of each and every copy of said book as long as republished and subject to a proper allowance to cover cost of authorship and other necessary expenses in the preparation of the said books, to be settled as hereinafter provided, and to be paid to the publishers of the first part, or at the option of the Department of Educa- for Ontario a sum in gross may be paid in lieu of such royalty, and allowance and expenses, the amount of said allowance and expenses or sum in gross to be settled by the Minister of Education and the publisher of the first part; or at the option of the Minister of Education by three arbitrators, one of whom shall be appointed by the Minister of Education, one by the said party of the First Part, and the third by the publisher desiring the said right of publication; or if more than one publisher applies at the same time for the said right, then the third arbitrator shall be appointed by the publishers so desiring the said right. And in case either or both of the said publishers so concerned shall for ten days after having been notified in writing of the appointment of an arbitrator by the Minister of Education as aforesaid, omit to appoint an arbitrator or to notify the Minister of Education in writing of his appointment, then the Minister of Education may appoint the other arbitrator or arbitrators so omitted to be appointed, and the said arbitration when so finally constituted shall have full power to consider the matters in question, and to examine all statements, vouchers and books furnished by the said parties, and the evidence of any kind whatsoever which they shall deem necessary, and to examine witnesses upon oath; and their decision in the premises or that of any two of them when given in writing shall be conclusive and binding upon the parties concerned, and the costs, charges and expenses of such arbitration shall fall upon and be borne by the applying publishers so desiring to republish. Provided also that after any arbitration has been held as aforesaid and the rights of the parties concerned have been settled thereby, if any other publisher or publishers should desire the said right of publication, then the Department of Education shall, if they think it proper to accord said right, give instruction as to the manner in which the said questions of the sum in gross or of the royalty should be settled by and between the parties interested therein.

17. And the Publisher hereby agree that if the Publisher or any of them (if more persons than one are of the First Part hereto) deliberately disregard the terms of this agreement, or fail to carry out the same in a matter of substance, the Publisher shall forfeit all his or their rights under this agreement, and the Minister of Education may apply to any Division of the High Court of Justice to restrain the Publisher from further printing, publishing or selling any copies of the said book not in accordance with this agreement.

18. Provided and it is hereby expressly agreed that no edition or copy of the said book shall be printed or published by the Publisher until the Publisher shall have executed these Presents and shall have executed to Her Majesty the Queen a bond in the penal sum of thousand dollars, with two sureties approved by the Minister of Education, each bound in the sum of thousand dollars, conditioned for the due observance and fulfilment by the Publisher of all the terms, conditions, clauses, agreements, obligations and covenants herein contained, and also of the Regulations of the Education Department from time to time in force respecting text-books for use in the Public Schools.

19. It is hereby expressly declared and agreed that the Minister of Education may, on giving the publisher one year's notice in writing, terminate this agreement at any time after the expiration of five years from the date hereof, and declare the said book no longer authorized as a text book for use in the schools of the Province of Ontario, in which case the copyright shall be assigned back by the Minister of Education to the original publisher.

20. Provided also that in case the Publisher or any other person entitled to any right by virtue of this agreement shall assign the same to any other person the right of the Publisher or such other person shall at the discretion of the Education Department thereupon cease and become forfeit and absolutely at an end.

21. To prevent any possibility of misapprehension, it is hereby expressly declared and agreed that in case there are more persons than one named as *of the First Part* hereto, the breach by anyone of such persons of any covenant, term or condition herein contained, whether such covenant, term or condition is affirmative or negative, shall be a breach for which all such persons shall be liable.

22. It is understood and agreed between the parties hereto that this agreement is entered into subject to the approval of His Honor the Lieutenant-Governor of the Province of Ontario in Council.

23. And the said publisher for himself, his successors and assigns, covenants, and agrees that when the Minister of Education secures the copyright of such other text-books authorized for High Schools, as are printed and published in Canada, or when the said Minister withdraws the authorization from such text-books aforesaid the copyright of which has not been surrendered on demand, then the said publishers shall, if requested, in writing, transfer, convey and assign, to the said Minister of Education the copyright of the said books.

In witness whereof the parties hereto have hereunto set their hands and seals the day and year first above written.

Signed, Sealed and Delivered in the Presence of

THIS INDENTURE, made in duplicate this day of in the year of Our Lord one thousand eight hundred and eighty

BETWEEN of the First Part

AND

HER MAJESTY THE QUEEN, represented herein by the Honorable the Minister of Education for the Province of Ontario, acting for the Education Department of Ontario, of the Second Part

Whereas, has by a certain indenture made upon the day of in the year of Our Lord one thousand eight hundred and eighty acquired from the said party of the second part the right to publish under conditions and restrictions fully set out in the said Indenture.

And Whereas the parties hereto have agreed to execute this Indenture so that the copyright in the said may be properly vested in the said party of the second part.

Now therefore, this Indenture witnesseth, that the part of the first part, in consideration of the premises and in further consideration of the sum of One Dollar, of lawful money of Canada to said part of the first part paid by the said party of the second part, the receipt whereof is hereby acknowledged, ha conveyed, asssigned and transferred and by these do convey, assign and transfer unto the said party of the second part, Her successors and assigns, all and any right, title or interest, property, claim or demand or right of proprietorship which may possess or in any way be entitled to, of, in or to the copyright of the said

To have and to hold the same to the said party of the second part, Her successors or assigns, with full power and authority to Her over the copyright in the said

And to have the sole right and liberty of printing, re-printing, publishing and vending the same, reserving however to the said the rights over the said provided for and contained in the said Indenture of the day of One thousand eight hundred and eighty- .

In witness whereof the parties hereto have hereunto set their hands and seals the day and year first above written.

Signed, Sealed and Delivered in the presence of)
)

Know all Men by these Presents, that hereinafter called the Publisher , and hereinafter called sureties, are jointly and severally firmly bound unto Her Majesty the Queen (represented herein by the Honorable the Minister of Education for the Province of Ontario, acting for the Education Department of Ontario) in the sums following, namely, the said in the sum of thousand dollars, and the said each in the sum of thousand hundred dollars, to be paid to Her Majesty the Queen and her successors, for which payment to be well and truly made we severally bind ourselves, our successors and assigns by these presents. Sealed with our seals and dated this day of in the year of our Lord one thousand eight hundred and

Whereas, the Publisher ha obtained from the Minister of Education representing the Education Department of the Province of Ontario, the right to print and publish prepared and authorized by the said Education Department, for use in the public schools of the Province of Ontario, under and subject to the terms and conditions of the annexed indenture of agreement dated the day of one thousand eight hundred and

Now the condition of the above obligation is such that if the said publisher , successors or assigns, do and shall observe, perform and fulfil the terms and conditions of the said indenture of agreement, and the regulations of the Education Department respecting text-books for use in the public schools as the same now are or may from time to time be in force, and if the several copies of the said books so printed shall in paper, printing, binding, and other qualities conform to the said indenture of agreement, and if the said books so printed shall be sold by the said publisher so that the retail price of each copy thereof for use in the public schools shall not exceed the maximum sum fixed by the said indenture of agreement, and if the said publisher do and shall observe, perform and fulfil as to each copy of the said book each and every of the terms and conditions of the said indenture of agreement, then these presents shall be void, otherwise to remain in full force.

Signed, Sealed and Delivered in the presence of)
)

REGULATIONS

Prescribed by the Lieutenant-Governor in Council, under "The Ontario Factories' Act."

Presented to the Legislative Assembly of Ontario,

By Command,

ARTHUR S. HARDY,
Provincial Secretary.

Provincial Secretary's Office,
Toronto, 30th January, 1888.

REGULATIONS

PRESCRIBED BY THE LIEUTENANT-GOVERNOR IN COUNCIL UNDER "THE ONTARIO FACTORIES' ACT."

(First Series, 1887).

Under and pursuant to *The Ontario Factories' Act*, the following rules, regulations and orders are on this 29th day of November, A. D. 1887, made by the Lieutenant-Governor in Council, for enforcing the provisions of the Act, for the conduct and duties of the Inspectors under the Act, and for the other purposes in said rules, regulations and orders mentioned :—

1. Unless the context otherwise requires, in all rules, regulations or orders made by the Lieutenant-Governor in Council, under or pursuant to *The Ontario Factories' Act*, the expression "the Act" shall mean *The Ontario Factories' Act;* the word "Commissioner" shall mean the Commissioner of Public Works for Ontario ; the expression "the schedule" shall mean the schedule of forms appended to these rules, regulations and orders ; and other words and expressions shall have the same meanings, respectively, as in *The Ontario Factories' Act.*

2. An Inspector shall not give permission for any exemption under the provisions of section 8 of the Act, unless the proposed exemption has been first submitted to and approved of by the Commissioner.

3. The resgister mentioned in and required by section 28 of the Act shall, so far as the same relates to children and young girls, be according to Form A in the schedule ; and so far as the same relates to women, be according to Form B in the schedule.

4. The register mentioned in and required by section 9 of the Act shall be according to the Form C in the schedule.

5. On the first page of any register kept by an employer, pursuant to the Act, or any rule, order or regulation made in that behalf by the Lieutenant-Governor in Council, shall be printed the Form D in the schedule, or one to the like effect ; and the same shall be properly filled up and signed by the Inspector and the employer, when such register is commenced to be kept.

6. Notice of the hours between which children, young girls or women are to be employed in any factory as required by section 10 of the Act, shall be according to Form E in the schedule.

7. Where an Inspector, under section 12 of the Act, notifies an employer of the action required to be taken because of any omission, neglect or default within the meaning of said section, the Inspector shall, in respect of any action so required to be taken, have regard to any special circumstances which, in his opinion, should be considered on behalf of the employer.

8. Notice to an Inspector, under sections 18 or 19 of the Act, may be in the Form F of the schedule.

9. Notice to an Inspector, under section 21 of the Act, may be according to such of the Forms G and H of the schedule as the case requires.

10. Notice to an Inspector, under section 28 of the Act, may be in the Form I of the schedule.

11. These rules, regulations and orders may be cited as "The Ontario Factories' Regulations (first series), 1887."

SCHEDULE OF FORMS.

(FORM A).

REGISTER OF CHILDREN AND YOUNG GIRLS EMPLOYED IN THIS FACTORY UNDER "THE ONTARIO FACTORIES' ACT."

No boy under twelve years of age, and no girl under fourteen years of age, can be employed in any factory. (Sub-sec. 1 of sec. 6).

The word "child" means a person under the age of fourteen years; the expression "Young Girl" means a girl of the age of fourteen years and under the age of eighteen years; the word "Woman" means a woman of eighteen years of age and upwards; and the word "Parent" means a parent or guardian of, or a person having the legal custody of, or control over, or having direct benefit from the wages of a child or young girl. (Sub-secs. 5, 6, 7 and 8, of sec. 2).

Columns 1, 2, 3, 4 and 5 to be filled up by the employer before a child or young girl is allowed to work.

1	2	3	4	5	6	7
Name of child or young girl.	Name of Parent or Guardian.	Residence of Parent or Guardian.	Date of first employment.	Nature of employment.	Age of child or young girl.	REMARKS. When a person ceases to be employed insert in this column opposite his or her name "Left." When a young girl becomes a woman within the meaning of the Act, insert opposite her name the word "Woman."

(FORM B.)

REGISTER OF WOMEN OF 18 YEARS OF AGE AND UPWARDS EMPLOYED IN THIS FACTORY.

Under "The Ontario Factories' Act," the word "child" means a person under the age of fourteen years; the expression "young girl" means a girl of the age of fourteen years and under the age of eighteen years; the word "woman" means a woman of eighteen years of age and upwards, and the word "parent" means a parent or guardian of, or a person having the legal custody of, or the control over, or having direct benefit from the wages of a child or young girl. (Sub-secs. 5, 6, 7 and 8 of sec. 2.)

1 Name.	2 Residence.	3 Date of first Employment.	4 Nature of Employment.	5 REMARKS. When a woman ceases to be employed insert in this column opposite her name, "Left."

(FORM C).

REGISTER OF THE CHILDERN, YOUNG GIRLS AND WOMEN EMPLOYED IN THIS FACTORY ON ANY DAY FOR A LONGER PERIOD THAN IS ALLOWED BY "THE ONTARIO FACTORIES' ACT." (See Sections 8 and 9.)

Dates when employed for a longer period etc.			Name of child, young girl or woman so employed.	Time of the day when employment begun.	Time of the day when employment ended.	Total of hours employed during day.	Nature of employment.
Month.	Day.	Year.					

(FORM D).

THE ONTARIO FACTORIES' ACT.

Factory to which this Register applies.

1. Name (if any) of factory
   Situate in
   Post Office to which letters for this factory are to be directed.
2. Nature of the work carried on
3. Nature and amount of moving power—
   (*a*) Steam-engine of about indicated horse-power, of which horse-power is employed in this factory.
   (*b*) Water wheel of about indicated horse-power, of which horse power is employed in this factory.
4. Clock
5. Name of the occupier and employer.

....
(*Signature of occupier or agent*).

To the Occupier and Employer in this factory.

I hereby give you notice that the clock named under heading No. 4 on this page, is the clock by which the hours of employment and times allowed for meals in this factory are to be regulated.

Dated this day of

.....
Inspector.

(FORM E).

THE ONTARIO FACTORIES' ACT.

NOTICE.

It shall not be lawful for a child, young girl or woman to be employed for more than ten hours in one day, nor more than for sixty hours in any one week, unless a different apportionment of the hours of labour per day has been made for the sole purpose of giving a shorter day's work on Saturday. (Sub-sec. 3 of sec. 6).

In every factory the employer shall allow each child and each young girl and woman therein employed not less than one hour at noon of each day for meals, but such hour shall not be counted as part of the time herein limited as respects the employment of children, young girls and women. (Sub-sec. 4 of sec. 6).

Notice of the hours between which children, young girls or women are to be employed shall be made in such form as shall be required by the regulations made in that behalf by the Lieutenant-Governor in Council, and shall be signed by the Inspector, and by the employer, and shall be hung up during the period affected by such notice, in such conspicuous place or places in the factory as the Inspector requires. (Sec. 10).

In accordance with the foregoing provisions of "The Ontario Factories' Act," it is hereby notified to all concerned that the hours between which children, young girls and women are to be employed in this factory, are as follows :—

——	Forenoon.		Afternoon.		Total hours each day.
	Commence at	Stop at	Commence at	Stop at	
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					

Total of hours for the week.....

Dated this.....day of.....

(*Signature of Employer or Agent.*).....

(*Inspector's Signature.*).....

(FORM F).

The Ontario Factories' Act.

To.....

Factories' Inspector.

You are hereby notified pursuant to sections 18 and 19 of "The Ontario Factories' Act" of the happening of an accident in the Factory hereunder mentioned, whereof the following are particulars :—

1. Name of person injured.
2. Factory in which injury happened.
3. Date of injury.
4. Age of person injured.
5. Residing on street in the of
6. Cause of injury.
7. Extent of injury.
8. Where injured person sent.
9. Remarks.

Dated this day of

(*Signature of Employer or Agent*).....

(FORM G).

THE ONTARIO FACTORIES' ACT.

To.....
Factories' Inspector.

Whereas by "The Ontario Factories' Act" it is in effect enacted, that a Factory shall not, within the meaning of the Act, be deemed to be conducted on the system of not employing therein either children or young girls until the occupier has served on an Inspector notice of his intention to conduct his Factory on that system.

I hereby give notice that it is intended to conduct the Factory situate at
in which is carried on the work following:
and of which
is the occupier, upon the system of not employing therein either children or young girls.

Dated this day of

.....
(*Occupier or Agent*).

(FORM H.)

THE ONTARIO FACTORIES' ACT.

To.....
Factories' Inspector.

It is intended after the date hereof, to discontinue to conduct the factory situated at of which
is the occupier. upon the system of not employing therein either children or young girls, within the meaning of "The Ontario Factories' Act."

Dated this day of

.....
(*Occupier or Agent*).

(FORM I).

THE ONTARIO FACTORIES' ACT.

To .....
Factories' Inspector.

Pursuant to section 28 of "The Ontario Factories' Act," I hereby give notice that I have begun to occupy a factory as undermentioned:

Name under which the business is carried on.....
Name of the Factory .....
Locality of the Factory .....
Address to which letters are to be addressed.....
Nature of the work .....
Nature and amount of moving power.....

Dated this day of

.....
(*Occupier or Agent*).

REPORT

Of the Assistant Inspector of Public Schools upon the condition of the French Schools in the United Counties of Prescott and Russell.

Presented to the Legislative Assembly,

By Command,

ARTHUR S. HARDY,
Provincial Secretary.

25th January, 1888.

REPORT

OF THE ASSISTANT INSPECTOR OF PUBLIC SCHOOLS UPON THE CONDITION OF THE FRENCH SCHOOLS IN THE UNITED COUNTIES OF PRESCOTT AND RUSSELL.

The Honorable the Minister of Education:

SIR,—I have the honor to submit the following report upon the condition of the French schools in the Counties of Prescott and Russell, with some general remarks suggested by what I have noticed on my visits of inspection.

I will not enter into general statistics, as all the reports are made to Mr. W. J. Summerby, Inspector, and will confine myself to what came to my notice. The total number of schools under my control is sixty-five, and I have the satisfaction to state that they are doing better work than when they were under the supervision of English Inspectors, who had not enough knowledge of the French to address the pupils in their mother tongue, much less to correct the pronunciation and examine in the various subjects taught.

The greater part of the buildings are log houses; six are clapboarded, two frame and four brick. Where they are not clapboarded the outside walls are whitewashed once or twice a year. Generally, the accommodation is not all that could be desired; but in most cases the authorities show a praiseworthy desire to make what improvements are within their reach. The provisions for lighting are in most instances very defective, very often the seats being placed so as to injuriously affect the children's eyes. With the exception of the schools of Curran, Alfred, Wendover, L'Original, Hawkesbury and No. 8 Clarence, where the windows are made to lower from the top, the means for proper ventilation are found wanting. The doors and windows being the only means to let out vitiated air, must necessarily be pernicious to the children. To obviate the danger incurred where the pure outside air is not admitted, I have advised and made it a rule for all the teachers to break the morning and afternoon sessions by a recess.

The school boards of Curran, Wendover, Alfred, Clarence Creek, L'Original, Hawkesbury, No. 7 Russell, No. 16 Clarence, have wisely provided well-fenced playgrounds. Some school grounds are partially enclosed; while others are altogether unenclosed, and the children of those schools naturally look to the road as being the most suitable place to take exercise. During the last six years five houses have been repaired and twelve have been built anew, that of Curran costing $2,100, Alfred, $1,900, Wendover $1,000, and No. 8 Clarence $1,100, not including the desks. The lighting and ventilation of these schools is quite satisfactory.

Reading shows a marked improvement from year to year. In schools of fair standing the subject is well taught and pupils give the selections with natural expression, but I must admit that in schools of rather low standing the lessons are read without any attention being given to the articulation, pausing and expression. Bad reading is ordinarily found in the classes of those teachers who care more for killing time than for the advancement of their pupils. In about one half of the schools the junior classes are taught reading by the phonetic method, which is certainly well adapted to the French, and for this reason I consider it far superior to any other. I regret very much to state that in certain sections the parents offer much opposition to this most excellent method, alleging that they want their children to be taught according to the French-Canadian pronunciation; but I hope that in due time we will overcome this difficulty and convince all opponents that if children are taught to read French they must also be taught to give the correct French pronunciation. It is gratifying for me to state that all pupils of the first class are required to reproduce the lesson in writing on the slate; this, no doubt,

affords them the means of spelling words correctly, and has the double advantage of keeping them orderly. Pupils of the second class are also required to write the selection on the slate, and besides to give its contents orally and in their own words, which with the help of a judicious teacher must be valuable as a language lesson. Pupils of the third and fourth classes give out in writing the contents of one or two paragraphs of the reading lesson. I consider this very effective as an exercise in spelling and composition. In mentioning this, of course, I have only reference to the schools which are considered thoroughly good. In writing the standard is quite satisfactory, the copy books are generally kept clean and in good condition, but I must admit that many teachers do not pay sufficient attention to the teaching of this subject; the principles being rarely illustrated on the blackboard. In junior classes slate writing has made remarkable progress; it is not uncommon to find little children either writing or printing a line or so of their lesson in a very legible manner. Arithmetic which, I am sorry to say, was a neglected subject, receives much attention in all the schools and is fairly progressing. To show to what extent this subject was neglected, I may mention that I once inquired of a lady teacher how many times a week she taught it and she answered that she taught arithmetic once a week, on Friday afternoon. Not long ago teachers hardly taught this subject to junior classes, confining them to reading and a little writing, the result being that children were found reading in the second book and were quite ignorant of numeration and notation; with the goodwill and co-operation of the teachers this state of things has changed, and they are taught to solve practical problems in an intellectual manner. Mental work, which was considered of very little importance, receives more attention than formerly and progresses satisfactorily. In the course of last year drawing has been introduced in a few of our schools. Children take a delight in this subject, they regard it as an amusement and a recreation. The most pleasing feature is that parents offer no opposition to the study of this new subject. Soon after my appointment I felt that something had to be done to elevate the standard of the schools. I therefore organized local meetings of the teachers in order to discuss and adopt the best methods of teaching. All the subjects are treated practically, and are illustrated by having in attendance classes of the pupils attending the school where these meetings are held. These, and a better attendance at the General Convention, have contributed much to the advancement of the schools. As it has been publicly asserted that the French are particularly averse to having the English taught, I must mention that forty-three teachers and four assistants teach English reading and spelling, and in some cases the translation of the English into French is also taught. Twenty-seven teach nothing but French, but of these twenty-one have some knowledge of the English, so that it leaves only six teachers who have no knowledge of the English. I have much pleasure in stating that when I visited the village school of Clarence, which is directed by Mr. Telesphue Rochon, after having gone through the various exercises, this gentleman intimated that his pupils could sing. I therefore invited them to prove their proficiency in this art, and was treated to a real good French song; then came last, but not least, the "God Save the Queen," which was executed in a truly grand style and in pretty good English. The lack of training and special preparation for the profession is a great drawback on the French schools of these counties. I looked forward with much pleasure on the establishment of a model school where our teachers would have the advantage of acquiring the knowledge that would fit them for the profession, and steps were taken to have it in operation last fall, but as the services of an efficient teacher could not be secured, the idea had to be abandoned for the time. Efforts will be made to have it opened in the course of the present year. There has been a change for the better since my first visit in 1881, and, on the whole, the work of education is carried on in a satisfactory manner.

The text books used in the schools are as follows:—

Reading—Graded series by Montpetit, being composed of the Alphabet, 1st, 2nd, 3rd and 4th Books, and a Treatise on Pronunciation by l'Abbe Lagace.

Grammar—By E. Robert Larrusse and Christian Brothers.

Geography—Primary, Intermediate and General, by Christian Brothers.

Arithmetic—Kirkland & Scott, Hamblin Smith and Christian Brothers.

Canadian History—By F. X. Toussaint.
English History—By Larrusse.
Composition—Methode pratique et raisonneé de style et decomposition by E. Robert.
Object Lessons—Recueil de Leçons de choses by J. B. Cloutier.
Drawing—By W. Smith and Canadian Drawing Course.
English Translation—Nouveau Cours of Obbendorf.
Dictionary—Chambers' Etymological and Universal Classique.
There is no particular text book in spelling, this subject being taught from the reading lessons.

Your Obedient Servant,

O. DUFORT,
Assistant Inspector Public Schools.

March 25th, 1887.

(No. 27).

Regulations respecting Upper Canada College. (*Not printed.*)

(No. 28).

Report of the Inspector of the Elgin House of Industry, for the year ending 31st October, 1887. (*Not printed.*)

COPY OF AN ORDER IN COUNCIL,

Approved on the 2nd Feb uary, 1888, commuting the fees payable to R. O'Hara, Esquire, Local Master and Deputy Registrar at Chatham. R. S. O. Cap. 42, sec. 168.

Presented to the Legislative Assembly of Ontario,

By Command,

ARTHUR S. HARDY,
Provincial Secretary.

Provincial Secretary's Office,
Toronto, 3rd February, 1888.

RETURN.

Copy of an Order in Council approved by His Honour the Lieutenant-Governor, the 2nd day of February, A.D. 1888.

L 1760.

Upon the recommendation of the Honourable the Attorney-General, the Committee of Council advise that the fees received by R. O'Hara, Esquire, as Local Master of the Supreme Court of Judicature for Ontario, at Chatham, and as Deputy-Registrar of the Chancery Division of the High Court of Justice for Ontario, be commuted at the sum of $1,600 per annum, to be computed from the first day of April next, and payable monthly, such sum to be in full of all services as such Local Master and Deputy-Registrar, including expenses of accommodations, clerks, books and stationery.

The Committee further advise, that it be a condition of the said commutation, that the said Master and Deputy-Regisrar shall see that the fees to which the Crown is entitled are duly paid in stamps, and that such stamps are properly cancelled.

Certified,

J. LONSDALE CAPRÉOL.

Assistant Clerk Executive Council,
Ontario.

(No. 30.)

Papers relating to a certain Mortgage, belonging to the estate of the late Andrew Mercer. (*Not printed.*)

(No. 31).

Papers relating to the bequest of one James Evenden, formerly of the Town of Barrie, to the Deaf, Dumb and Blind Institution of Upper Canada. (*Not printed.*)

ORDERS IN COUNCIL

Commuting the Fees of certain Surrogate Judges.

Presented to the Legislative Assembly of Ontario.

By Command,

ARTHUR S. HARDY,
Provincial Secretary.

Provincial Secretary's Office,
Toronto, 30th January, 1888.

FEES OF CERTAIN SURROGATE JUDGES.

COPY of an Order in Council approved by His Honour the Lieutenant-Governor, the 18th day of June, A.D. 1887.

(N 786.)

Upon the recommendation of the Honourable the Attorney-General and His Honour Judge Wilkinson, Judge of the County Court of the County of Lennox and Addington, having consented thereto, and it appearing that the income derived by the said Judge from the fees payable under the Surrogate Courts Act amounted to $503.50 for the year 1886, the Committee of Council advise that the fees payable to the said Judge, under the said Act, be commuted for the annual sum of $400, to be paid in monthly instalments, such commutation to date from the first day of July next.

The Committee further advise that it be a condition of the said commutation that the Judge shall see that the fees to which the Crown is entitled are duly paid in stamps, and that such stamps are properly cancelled.

Certified.

J. LONSDALE CAPRÉOL,
Asst. Clerk Executive Council,
Ontario.

COPY of an Order in Council approved by His Honour the Lieutenant-Governor, the 18th day of June, A.D. 1887.

(N 790.)

Upon the recommendation of the Honourable the Attorney-General and His Honour Judge Ross, Judge of the County Court of the County of Carleton, having consented thereto, and it appearing, that the income derived by the said Judge from the fees payable under the Surrogate Courts Act amounted to $502.50 for the year 1886, the Committee of Council advise that the fees payable to the said Judge, under the said Act, be commuted for the annual sum of $500, to be paid in monthly instalments, such commutation to date from the first day of July next.

The Committee further advise that it be a condition of the said commutation that the Judge shall see that the fees to which the Crown is entitled are duly paid in stamps, and that such stamps are properly cancelled.

Certified.

J. LONSDALE CAPRÉOL,
Asst. Clerk Executive Council,
Ontario.

(No. 33).

Return of a copy of the Charter of the Ontario Grain and Seed Company with the names of the Incorporators; list of stockholders and amount of stock paid up, as shewn by any records of the Department, together with copies of all documents and papers filed with the Government upon or relating to the Charter. Also, copies of all correspondence between the Government and the Company, or others, in relation to the Company. Also, statement of any moneys deposited with the Government, if any, and any other information in the possession of the Government relating to the Company. (*Not printed.*)

(No. 34.)

Statement of the affairs of the Toronto General Trusts Company, under 35 Vic. c. 83, s. 13, for the year 1887. (*Not printed.*)

ANNUAL REPORT

OF THE

INSPECTOR OF DIVISION COURTS

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR

1887.

Printed by Order of the Legislative Assembly.

Toronto:
PRINTED BY WARWICK & SONS, 26 & 28 FRONT STREET WEST.
1888.

ANNUAL REPORT

OF THE

INSPECTOR OF DIVISION COURTS

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR 1887.

OFFICE OF THE INSPECTOR OF DIVISION COURTS,
TORONTO, December 31st, 1887.

To the Honourable Sir ALEXANDER CAMPBELL, K.C.M.G.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit the following report upon the Division Courts for the year 1887:—

The usual tables, shewing the business of the Division Courts of the Province for the year, are herewith submitted.

MAGNITUDE OF THE BUSINESS.

From Table A it will be seen that there were entered 61,169 suits, exclusive of transcripts of judgments and judgment summonses. The amount of claims entered, exclusive of transcripts of judgments and judgment summonses, was $2,368,491.56.

The total number of suits entered exceeded those of the previous year by 3,366 and shewed an increase in the amount of claims of $359,963.06.

The transcripts of judgments numbered 4,271, representing $214.393.81.

In the same table full details are supplied of the total amount of suitors' money paid into and out of court, in each court and in each county or district; the number of suits entered where the amount claimed exceeded $100, and the number of actions of tort and of replevin where the amount claimed exceeded $40. Other columns in the same table shew the number of trials by juries, the amount paid to jurors summoned; the number of jury trials called in pursuance of section 122 of the Division Courts Act; the amount paid

towards Division Court jury fund; the amount paid the Treasurer of the Province; the number of cases in which fees to counsel were allowed, and the amount at which such fees were taxed.

The amount paid into the Provincial Treasury was $7,465.14, as against $6,253.30 in 1886.

Vacancies—New Appointments, etc.

In the lists of Clerks and Bailiffs, given in Tables B and C, a number of changes, caused by deaths, resignations, removals, etc., will be observable, there having been a large number of new appointments from these causes during the year just closed. In all there were 26 new appointments of Clerks and 45 new appointments of Bailiffs.

Of the vacancies in clerkships, five were caused by death; three by removal from office for misconduct; six were appointed to newly established courts, and the remainder to fill vacancies caused by resignations.

During the year there were 29 resignations of office by Bailiffs; six vacancies occurred through death; three were caused by removal for misconduct, and seven were appointed to new courts. There were also four vacancies caused by death, removals and resignations of Bailiffs belonging to courts having more than one Bailiff, and to whom it was considered unnecessary to appoint successors, inasmuch as the other acting bailiffs were considered as adequate to the performace of all the duties.

Leave of Absence.

Leave of absence was granted to 47 Clerks and 26 Bailiffs for periods varying from one week to two months—care being taken to have the proper forms filled out and suitable deputies appointed pursuant to the statute.

Complaints.

There were 117 complaints against Clerks and 84 complaints made against Bailiffs—these numbers being in excess of any previous year. The character of the charges against the former were principally of improperly retaining suitors' moneys paid into court; of neglect in answering letters; overcharges; using office for the purpose of making irregular collections; improper taxation of costs, and not furnishing items in detail, as required by law, etc.; and against Bailiffs, of not making returns, neglect, collusion, etc., etc.

Prompt attention was given by this Department to every complaint, and investigations held, where the explanations given proved unsatisfactory. In the greater number of cases, where suitors' moneys were withheld, the prompt action taken resulted in a speedy settlement with the complainants. Other causes of complaint have been corrected and promises obtained against the repetition of the offences complained of. In more serious cases, and those of repeated and persistent wrongdoing, the offending officers were, after due investigation, reported to the Government and the proper remedy applied. As mentioned in last year's annual report, the ready facilities which this Department affords for redress are becoming more widely known, and are now quickly resorted to by suitors and their solicitors on all occasions of default or delay, or other illegitimate practices by

Clerks or Bailiffs. Numerous letters continue to be received attesting how well the services of the Department are appreciated in this respect.

Sureties of Clerks and Bailiffs.

Over seven hundred returns and corrections were received, on forms specially prepared and sent to Clerks and Bailiffs, supplying necessary information as to the covenants given by these officers for the performance of their duties. I beg to repeat here, what was urged by me in last year's annual report, that the rule (173), requiring the reports of Clerks as to the sureties of themselves and Bailiffs at the sittings of the courts, should be rigidly enforced. There is still much neglect and inattention in notifying this Department of the death, insolvency, and other changes of sureties. Applications are being constantly made for the names of the sureties of officers and the amount of penalty in bonds. For the purposes of the Department, and in order to supply this information accurately, the returns mentioned were obtained. The new register, in which this information is being embodied, shews at a glance the date of appointment, full name and post office of each Clerk and Bailiff and his sureties; the calling or business of the latter, the amount in which each is held, the date of covenant, date of filing same, the date of any change, and from what cause, and all other necessary particulars.

Division Court Boards.

I have attended meetings of the Division Court Boards during the year, at which the limits of courts were fixed and new courts established. The change from the old system continues to work most satisfactorily.

New Courts.

Six new courts were established during 1887, the locations and limits of which are given elsewhere in their proper places.—Table D.

Judgment Debtors.

Appended will be found a carefully tabulated return (Table E) relating to judgment debtors for 1885 and 1886. It shows the number in each county who, for the twelve months ending 31st December in each of these years, were ordered to be committed under each of the five heads mentioned in the 182nd section of the Division Courts Act; the total number of orders; the total commitments; the percentage of orders of judgment summonses, and the percentage of committals of judgment summonses issued.

It is certain that a large amount of money is recovered under judgment summons process, and that many just claims would be lost to suitors were they deprived of this recourse.

Inspection, Departmental Duties, etc.

A large share of my time was devoted to the duties of outside inspection during the past year, and with good effect.

The departmental duties continue increasing. Correspondence has increased more than fifty per cent. within the last two years. Opinions on items of the tariff; decisions

on points of taxation ; enquiries for information, and communications of all kinds have grown more numerous. Replies have to be given promptly, and occupy much time and attention. Personal interviews with complainants and callers desiring information make large drafts upon the time of the Inspector, to say nothing of the time demanded by investigations and the reports submitted thereon.

Annual Report.

Applications for copies of the annual report have multiplied exceedingly and necessitate the printing of a larger edition.

I have the honour to be
Your Honour's obedient servant,

JOSEPH DICKEY,
Inspector.

TABLES.

TABLE A.

RETURN of Division Court Business, from the First day of January to the Thirty-first day of December, A.D. 1887, inclusive, shewing:—

The Name of County, United Counties or District.	The number of Divisions, in each County, United Counties or District.	The number of Suits entered, exclusive of Transcripts of Judgments and Judgment Summonses, in each County, United Counties or District.	The amount of Claims entered, exclusive of Transcripts of Judgments and Judgment Summonses, in each County, United Counties or District.	The number of Transcripts of Judgments received from other Courts, in each County, United Counties or District.	The amount of Claims received by Transcripts of Judgments, from other Courts, in each County, United Counties or District.	The number of Judgment Summonses issued, in each County, United Counties or District.	The total amount of Suitors' money paid into Court, in each County, United Counties or District.	The total amount of Suitors' money paid out of Court, in each County, United Counties or District.	The number of Suits entered, where the amount claimed exceeds $100, in each County, United Counties or District.	The number of actions for Tort, where the amount claimed exceeds $40, in each County, United Counties or District.	The number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40, in each County, United Counties or District.	The number of Jury Trials by Juries summoned, in each County, United Counties or District.	The amount paid to Jurors summoned, in each County, United Counties or District.	The number of Jury Trials by Jurors called, in pursuance of Sec. 122 of "The Division Courts Act," in each County, United Counties or District.	The amount payable to Treasurer for "Division Court Jury Fund," in each County, United Counties or Districts.	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province, in each County, United Counties or District.	The number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees, under Sec. 16 of "The Division Courts Acts, 1880."	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
ALGOMA.....	1	31	1608 19	1	61 50	2	300 29	300 29	4									
	2	67	3221 89	8	593 24	....	2881 03	2881 03	5	....	....	....	....	....	....	....	....	....
	3	32	1600 21	3	252 10	....	865 71	860 71	2	....	....	....	....	....	....	....	....	....
	4	42	1639 67	14	962 15	10	1737 96	1716 47	5	1	....	....	....	....	1	31 51	....	....
	5	88	3479 82	11	274 30	6	397 54	354 79	5	....	....	....	....	....	....	3 26	....	....
	6	33	1150 56	3	135 00	....	473 89	473 89	1	....	....	....	....	....	....	88	....	....
BRANT	1	772	32207 36	38	1187 76	74	7271 63	6972 42	72	8	....	2	18 00	....	32 26	100 48	10	51 00
	2	215	5705 93	13	200 72	26	1654 89	1640 18	8	....	2	....	....	....	5 12	....	....	....
	3	64	2118 19	3	168 97	....	1025 28	769 91	4	2	....	....	11 00	....	2 73	....	....	....
	4	80	1942 48	20	745 58	3	888 15	833 95	2	....	....	1	12 00	1	2 23	....	....	....
	5	48	1673 57	15	841 51	5	716 10	694 63	2	1	1	1	12 00	....	2 05	....	....	....
	6	14	564 71	6	207 30	1	49 65	49 65	1	....	....	....	....	....	64	....	....	....

RETURN of Division Court Business.—*Continued.*

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													$ c.		$ c.		$ c.	$ c.
ALGOMA.....	6	296	12700 34	40	2218 29	18	6656 42	6587 18	22	1	.....	.....	.....	1	13 21	.....	.....	.....
BRANT.....	6	1193	44602 24	95	3351 84	109	11605 70	10960 74	89	11	3	5	53 00	1	45 03	100 48	10	51 00
Carried forward.	12	1489	57302 58	135	5570 13	127	18262 12	17547 92	111	12	3	5	53 00	2	58 24	100 48	15	81 00

RETURN of Division Court Business.—*Continued.*

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		C.		$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		
Bruce	1	1	373	13269 64	16	1005 08	51	4846 80	4830 76	23	6		3	30 00		13 28	1 97	3	18 00
	2	2	227	6298 68	17	1075 75	16	2560 11	2480 51	8	2	2	1	11 00		6 76			
	3	3	156	6 016 76	14	784 20	23	2275 36	2130 91	25		1	1	10 00		7 24		2	6 00
	4	4	173	6361 73	12	845 71	11	2666 63	2644 33	9						6 17			
	5	5	130	4226 19	15	671 33	13	2666 63	916 78	7						3 85		1	5 00
	6	6	37	1869 09	4	114 91	2	896 41	1663 72	4						2 02			
	7	7	124	5 87 85	17	575 60	6	1663 72	1638 50	18	1					7 05		2	8 00
	8	8	360	8 480 91	17	640 40	23	3280 34	3236 99	18		1	1	12 00	1	9 77		5	25 00
	9	9	34	1155 42	5	202 60	6	466 08	466 08	1	2				1	1 00		1	3 00
	10	10	48	1402 57	9	513 14	4	680 33	653 69	1						1 21			
Carleton	1	1	1490	59737 87	42	2589 90	440	14171 50	14143 92	129		1				60 06	866 08	11	81 00
	2	2	41	1401 96	5	413 86	3	465 68	465 68	1						1 24			
	3	3	23	794 04	6	112 82	1	547 41	547 41	1						64			
	4	4	56	2566 00	14	643 00	2	1089 00	1116 00	6						2 55		1	5 00
	5	5	46	1304 72	10	986 44	3	1162 51	1162 51	3						1 59		2	20 00
	6	6	63	2658 64	4	68 02	1	927 81	927 81	4			1	12 00		3 00			
	7	7	49	1753 59	2	36 82	2	870 33	807 04	5						1 94			

RETURN of Division Court Business.—*Continued.*

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RETURN of Division Court Business.—*Continued.*

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				$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
1	DUFFERIN	1	315	12771 43	18	1199 68	18	4720 84	4663 12	32			1	12 00		14 26		1	5 00
2		2	381	16070 70	23	1461 72	23	4591 87	4661 43	42	4	1				19 23		5	25 00
3		3	144	5843 27	13	1918 35	13	3367 78	3352 77	10		1				5 68			
4		4	61	2236 00	2	115 25	2	771 40	706 40	6	2					2 67			
5		5	118	5166 95	6	294 33	6	1867 78	1854 35	11			1	12 00		5 65			
1	ELGIN	1	386	14534 01	36	2021 66	51	7096 05	7001 34	30	1		4	22 00		15 92		1	10 00
2		2	64	2369 24	9	990 41	11	1075 59	1058 39	5			1	15 00		2 39			
3		3	749	31357 87	29	1645 65	37	12313 02	12317 74	76	3	2	2			33 20	119 20	1	20 00
4		4	207	9249 10	38	2017 56	17	4978 76	5080 18	20	3	1	1	8 00		10 12			
1	ESSEX	1	96	2653 92	2	187 07	5	1160 39	1160 39	1						1 69		1	5 00
2		2	200	9457 36	20	979 88	18	4138 69	3837 31	22	1		1	7 00		9 88		4	20 00
3		3	93	3923 69	9	134 80	14	2088 35	2032 52	5	1					3 35			
4		4	67	1937 36	3	164 41	8	1110 15	1076 10	3						1 71			
5		5	236	9880 85	11	971 87	31	4972 00	4939 81	28			1			11 17		1	5 00
6		6	204	7478 74	14	697 56	57	3110 45	3051 65	14	1					7 13		2	15 00
7		7	331	14778 51	21	1130 36	39	6124 02	6006 83	30		1				14 64		2	15 00
8		8	302	14212 95	19	960 49	50	5374 17	4801 94	33	2	5				12 84	4 39	3	15 00

RETURN of Division Court Business.—*Continued.*

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					$ c.		$ c.	$ c.					$ c.			$ c.		$ c.
Brought forward	29	4919	183488 27	344	16849 91	734	59305 98	58157 55	374	23	14	13	128 00	4	187 71	968 53	43	252 00
DUFFERIN	5	1019	42127 85	61	5949 33	62	15319 67	15238 07	101	6	1	2	24 00	1	47 49	.....	6	30 00
ELGIN	4	1406	57510 22	112	6675 28	116	25463 42	25457 65	136	7	5	7	55 00	.....	61 63	119 20	2	30 00
ESSEX	8	1589	64423 28	99	5226 44	222	28078 22	26906 55	136	5	8	1	7 00	.....	62 45	4 39	8	75 00
Carried forward	46	8913	347549 62	616	34700 96	1134	128167 29	125759 82	642	41	28	23	214 00	5	359 28	1092 12	59	387 00

RETURN of Division Court Business.—*Continued.*

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				$. c.		$. c.		$. c.	$. c.					$. c.		$. c.	$. c.		$. c.
1	FRONTENAC.....	1	657	31693 38	28	414 31	35	9639 82	9443 08	80	5	.....	.....	.....	.....	34 31	106 25	5	16 00
2		2	26	898 80	1	23 65	1	303 85	277 77	1	1	.....	.....	.....	.....	70	.....	.....	.....
3		3	48	1379 44	4	283 67	1	1000 18	995 23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4		4	208	5939 32	29	1065 06	33	2968 08	2919 40	8	.....	.....	1	12 00	.....	6 19	.....	1	8 00
5		5	66	1845 71	4	98 52	2	556 40	537 90	2	1	.....	.....	12 00	.....	1 90	.....	.....	.....
6		6	194	7194 78	2	54 49	13	583 31	559 44	11	.....	.....	2	23 00	.....	7 56	.....	1	2 00
7		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	GREY	1	470	20672 56	51	2332 09	102	7797 19	7797 19	45	.....	1	1	12 00	....	21 26	41 21	6	30 30
2		2	264	10879 70	23	1846 21	37	5083 86	4869 53	26	4	.....	3	24 00	....	13 25	.....	5	25 00
3		3	392	16110 39	16	902 63	64	5952 81	5916 00	34	.....	.....	.....	.....	.....	16 42	6 70	4	35 00
4		4	157	6475 30	15	815 09	18	2343 51	2485 03	17	.....	1	.....	.....	.....	7 22	.....	2	15 00
5		5	347	13701 49	59	3361 11	35	6871 15	6973 76	18	2	.....	.....	.....	.....	11 34	.....	4	35 00
6		6	182	5018 13	18	612 72	39	2590 90	2467 49	8	5	.....	.....	.....	.....	5 42	.....	4	20 00
7		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

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			$.	c.		$.	c.		$.	c.		$.	c.							$.	c.			$.	c.		
Brought forward.	46	6	1139	48951	43	68	1934	85	15651	04	12167	29	11732	82	12759	82	102	7	4	23	4	214	00	47	00	51	35	359	28	1082	12	106	25	7	26	00
FRONTENAC	6	1139	48951	43	68	1934	85	15651	04	12167	29	11732	82	12759	82	102	7	4	23	4	214	00	47	00	51	35	359	28	1082	12	106	25	7	26	00
GREY	8	1812	72857	57	182	9869	85	195	30639	42	30569	00	148	12	4	36	00	.....	75	51	47	91	1002	12	106	25	47	91	25	160	00
Carried forward.	60	11921	469358	62	866	46510	51	1414	173857	75	171001	64	892				60		34		31	297	00	5		486	14		1246	28		91		573	00

RETURN of Division Court Business.—*Continued.*

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				$	c.		$	c.		$	c.		$	c.						$	c.			$	c.	
HALDIMAND	1	1	90	3176	86	6	447	43	5	1080	45	983	83	6	1	1				12	00	1	3	53		
	2	2	35	1643	04	3	162	80	...	58	49	58	49	4	...	...				8	00	1	2	07		
	3	3	152	4129	43	14	643	72	14	1670	40	1748	33	3	1	...				...		...	3	27		
	4	4	27	845	46	1	28	62	1	473	14	473	14	2	...	...				...		...		92		
	5	5	17	544	89	1	54	09	5	386	44	386	44	1	...	...				...		...		49		
	6	6	156	6786	99	33	1734	73	32	3217	78	3217	78	8	1	1				...		...		5	90	
HALIBURTON	1	1	55	1801	38	15	835	31	5	770	65	802	32	1	3	4				...		...		1	27	
	2	2	77	1372	71	3	173	62	1	888	12	888	12	...	3	...				...		...		1	63	
HALTON	1	1	118	6154	70	19	1109	53	22	2706	75	2429	20	14	1	...			3	32	00	...		8	12	
	2	2	69	2726	92	7	96	46	9	2785	05	2684	10	5	...	...			1	12	00	...		3	07	
	3	3	112	3153	38	6	211	96	28	1189	51	1170	51	3	...	...			1	24	00	...		3	14	
	4	4	75	1946	24	10	311	27	10	677	90	644	78	2	...	...			...	...		...		1	58	
	5	5	29	682	50	4	185	00	1	682	50	666	05	3	...	1			...	...		...		1	17	
	6	6	56	1437	91	8	279	68	..	503	38	486	26	6	...	...			...	...		...		2	31	

RETURN of Division Court Business.—*Continued.*

THE NAME OF COUNTY, UNITED COUNTIES OR DISTRICT.	The number of Divisions, in each County, United Counties or District.	The number of Suits entered, exclusive of Transcripts of Judgments and Judgment Summonses, in each County, United Counties or Districts.	The amount of Claims entered, exclusive of Transcripts of Judgments and Judgment Summonses, in each County, United Counties or District.	The number of Transcripts of Judgments received from other Courts, in each County, United Counties or District.	The amount of Claims received by Transcripts of Judgments, from other Courts, in each County, United Counties or District.	The number of Judgment Summonses issued, in each County, United Counties or District.	The total amount of Suitors' money paid into Court, in each County, United Counties or District.	The total amount of Suitors' money paid out of Court, in each County, United Counties or District.	The number of Suits entered, where the amount claimed exceeds $100, in each County, United Counties or District.	The number of actions for Tort, where the amount claimed exceeds $10, in each County, United Counties or District.	The number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40, in each County, United Counties or District.	The number of Jury Trials by Juries summoned, in each County, United Counties or District.	The amount paid to Jurors summoned, in each County, United Counties or District.	The number of Jury Trials by Jurors called, in pursuance of Sec. 152 of "The Division Courts Act," in each County, United Counties or Districts.	The amount payable to Treasurer for "Division Court Jury Fund," in each County, United Counties or District.	The amount of Fees and Emoluments payable to the Honourable the Treasurer for the use of the Province, in each County, United Counties or District.	The number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees, under Sec. 16 of "The Division Courts Act, 1880."	The amount of costs so taxed.
			$ c.		$ c.		$ c.	$ c.							$ c.	$ c.		$ c.
Brought forward.	74	13012	505621 03	996	52789 73	1547	190948 31	187732 60	948	70	41	38	385 00	9	523 61	1246 28	91	573 00
HALDIMAND.....	6	497	17126 67	58	3071 39	57	6886 70	6959 62	22	3	2	2	20 00	2	16 18	.....	.....	513 00
HALIBURTON.....	2	132	3074 09	18	1008 93	6	1658 77	1690 44	1	6	4	.....	.....	2	1 90	.....	.....	.....
HALTON.....	6	459	16061 65	54	2193 90	70	8545 09	8080 90	33	1	1	5	68 00		19 39	.....	.....	.....
Carried forward.	74	13012	505621 03	996	52789 73	1547	190948 31	187732 60	948	70	41	38	385 00	9	523 61	1246 28	91	573 00

RETURN of Division Court Business.—*Continued.*

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				$	c.		$	c.		$	c.		$	c.											$	c.		$	c.
1	HASTINGS.....	1	622	27534	26	22	1086	16	68	5197	06	5176	15	67	3			3	22	00				30	82	11	09	2	7	00
2		2	62	1956	94	2	.....		12	553	75	546	34	1	.....			.....	.....					1	45	.....		1	2	75
3		3	144	2340	56	5	.....		.....	1553	66	1550	65	2	.....			.....	.....					1	61	.....		1	5	00
4		4	163	2187	61	10	94	24	.....	841	61	810	08	2	.....			.....	.....					2	00	.....		.....	.....	
5		5	171	7123	86	12	221	69	6	2804	48	2804	86	14	.....		2	.....	.....					7	19	.....		1	5	00
6		6	221	7602	14	12	508	72	42	2183	42	2171	52	15	.....			2	18	00				8	26	.....		1	10	00
7		7	151	3842	58	13	669	51	18	1641	95	1668	15	.....	.....			.....	.....					3	33	.....		1	3	00
8		8	197	3685	80	3	193	50	34	1006	86	1006	86	6	.....			.....	.....					3	42	.....		.....	.....	
9		9	320	10432	57	31	984	72	17	3409	33	3372	83	14	4			.....	.....					9	77	.....		.....	.....	
10		10	97	3028	80	14	972	00	15	1405	75	1394	63	5	.....			.....	.....					2	78	.....		3	15	00
11		11	96	2787	17	4	155	58	17	747	81	695	47	2	.....			.....	.....					2	42	.....		.....	.....	
12		12	125	3423	75	10	424	43	4	949	80	949	80	5	.....			1	18	30				3	55	.....		3	19	00
1	HURON.....	1	145	7022	32	16	722	66	14	1009	27	1787	37	17	.....			3	22	00				9	11	.....		2	15	00
2		2	382	12312	65	18	979	22	20	4115	11	4109	11	28	1			.....	.....					12	31	.....		3	30	00
3		3	212	9129	00	20	1098	00	33	2495	00	2495	00	26	1			.....	.....					10	16	.....		.....	.....	
4		4	226	9701	15	25	1658	84	21	3519	36	3411	19	25	.....			.....	.....					10	39	.....		2	20	00

RETURN of Division Court Business.—*Continued.*

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Brought forward	74	130 2	505621 03	996	52789 73	1547	190048 31	187732 60	948	70	41	38	385 00	9	523 61	1246 28	91	573 00
H STINGS	12	2309	76246 04	138	5641 45	238	22295 48	22147 34	133	7	2	6	58 30	.....	76 60	11 09	13	66 75
	1	965	8165 12	79	4158 89	88	12039 74	11802 67	96	2	3	3	22	.....	41 97	.....	7	65 00
Carried forward	90	13286	620022 19	1213	62889 57	1873	225283 53	221682 61	1177	79	46	47	443 52	9	642 18	1257 37	111	704 75

RETURN of Division Court Business.—*Continued.*

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	HURON—*Con*			$ c.		$ c.		$ c.	$ c.					$ c.		$ c.		$ c.	
5		5	109	5111 04	11	568 05	13	2545 09	2523 80	12				24 00		6 55		15 00	
6		6	63	2841 66	8	351 08	6	1190 08	1147 39	11				24 00		5 13		10 00	
7		7	79	4013 67	4	202 05	2	2184 55	2184 55	11						4 07		10 00	
8		8	200	9070 39	28	1397 72	14	3939 10	3861 31	19						9 17			
9		9	70	2110 00	14	1297 08	2	1447 13	1415 65	3			1	35 00	1	2 48			
10		10	69	2925 64	12	488 46	2	1892 91	1854 91	5						2 87		5 00	
11		11	120	3695 20	2	55 68	1	2075 71	2059 31	8		1				2 15			
12		12	96	2517 80	7	176 64	13	365 50	350 00	5		1							
	KENT.....																		
1		1	617	25900 40	51	2315 60	176	9055 59	9512 63	76	6	3				30 79		40 00	
2		2	256	9199 81	19	660 71	74	4702 53	4617 46	19	4	3	1	11 00		9 51		15 00	
3		3	170	5128 88	21	865 98	42	2914 48	2912 98	8	2					4 58			
4		4	92	2876 58	5	155 53	13	1491 85	1491 85	3	1					2 58			
5		5	251	8085 43	19	565 17	27	3116 68	3060 94	10	7	1	1	29 00	1	7 38		15 00	
6		6	171	5292 57	25	1402 36	32	1986 38	1950 00	9	2					4 47		5 00	
7		7	109	4273 19	20	836 28	8	1738 63	1480 15	6	3					3 66			

RETURN of Division Court Business.—*Continued.*

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													$ c.		$ c.	$ c.		$ c.
Brought forward.	109	18723	713064 45	1459	74227 96	2298	265929 74	26210564	1382	104	55	54	566 52	11	737 57	1311 17	130	819 75
HURON	12	1771	32285 40	86	6536 76	53	15640 07	1536846 92	74	....	2	5	83 00	1	32 42	1257 37	5	40 00
KENT	7	1666	60756 86	160	6801 63	372	25006 14	2502601	131	25	7	2	40 00	1	62 97	53 80	14	75 00
Carried forward.	109	18723	713064 45	1459	74227 96	2298	265929 74	26210564	1382	104	55	54	566 52	11	737 57	1311 17	130	819 75

RETURN of Division Court Business.—*Continued.*

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				$ c.		$ c.		$ c.	$ c.					$ c.		$ c.			$ c.
1	LAMBTON.....	1	289	9665 25	24	975 61	53	2606 66	2557 19	17	1		3	29 00		11 15			15 00
2		2	135	4474 79	4	124 64	5	2634 33	4634 33	10			2	24 00		4 86			10 00
3		3	99	3234 26	22	1271 38	6	2669 43	2160 71	3			1	11 00		2 99			
4		4	76	2703 84	17	441 99	2	1580 27	1537 25	5		1				2 63			10 00
5		5	283	51811 06	13	677 26	3	3221 76	3221 76	25	47		2	12 00	1	10 52			23 00
6		6	50	1700 18	6	509 48	4	774 73	757 73		2		4	46 00		3 05			
7		7	100	3888 40	8	376 04	2	1209 86	1160 72	9			1	12 00		4 43			5 00
8		8	399	12448 83	50	1988 02	77	4221 87	4333 98	20	2		1	10 00		11 74		1	15 00
9		9	159	4105 10	9	417 39	15	3205 03	3072 53	8						4 76			
1	LANARK.....	1	254	6957 09	10	314 09	30	2617 31	2681 25	11		1	1	9 00		6 94		4	20 00
2		2	42	1867 68	5	463 39	4	789 84	754 99	5						2 06			
3		3	118	3905 05	9	594 06	16	1585 36	1585 36	6	1					3 27		6	14 00
4		4	302	6471 54	6	126 95	51	2774 18	2755 76	3	2					5 19		3	15 00
5		5	26	963 95	3	144 87		580 66	573 68	2		1				1 31			
6		6	172	7277 60	8	233 75	21	1945 20	1945 20	19	2					7 66		2	14 00

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.	$	c.					$	c.			$	c.		$	c.			
Brought forward.	109	18723	713064	45	1459	74227	96	2298	265929	74	262105	54	1382	104	55	54	566	52	11	737	57	1311	17	130	819	75
LAMBTON.....	9	1590	94031	71	153	6781	81	167	23523	94	23376	20	97	56	1	14	144	00	1	56	13	.....		12	78	00
LANARK.....	6	914	27442	91	41	1877	11	122	10292	55	10296	24	46	5	2	1	9	00	.....	26	43	.....		15	63	00
Carried forward.	124	21227	834539	07	1653	82886	88	2587	300746	23	295777	98	1525	165	58	69	719	52	12	820	13	1311	17	157	960	75

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				$	c.		$	c.		$	c.		$	c.						$	c.			$	c.			
LEEDS AND GRENVILLE.....	1	678	19822	00	11	485	50	125	7806	00	7732	54	28	1	1	2	17	00	18	18	20	1	5	00
	2	161	5510	00	7	293	78	16	2889	43	2728	80	10	....	.....	.....	.....		3	4	63	.....	.....	
	3	231	6689	00	13	529	51	...	2137	74	2038	71	13	....	.....	.....	.....		5	.....	.....	.....	.....	
	4	162	6857	80	6	246	00	26	3126	28	2927	88	20	1	.....	.....	.....		6	7	40	.....	.....	
	5	172	4376	73	4	284	30	12	1643	83	1643	83	5	....	.....	.....	.....		9	4	15	.....	.....	
	6	213	8432	21	1	49	90	8	4187	45	4126	91	19	4	.....	.....	11	00	7	8	86	.....	.....	
	7	77	2381	57	2	14	75	3	948	87	927	82	2	....	.....	.....	.....		4	1	88	.....	.....	
	8	101	4019	30	4	418	56	5	563	71	563	71	7	4	.....	.....	.....		3	3	85	.....	.....	
	9	140	4325	61	3	100	19	11	2825	30	2760	18	7	1	.....	.....	.....		2	4	00	1	4	00
	10	26	1289	47	3	78	72	2	509	90	512	48	2	1	.....	.....	.....		2	1	10	.....	.....	
	11	53	900	85	3	100	74	8	483	60	444	35	1	....	.....	.....	.....		2	2	70	.....	.....	
	12	63	2016	54	5	358	78	2	1186	92	1164	55	4	....	.....	1	23	00	3	2	25	.....	.....	
LENNOX AND ADDINGTON.....	1	408	12876	24	22	1500	57	49	5440	23	5353	26	29	4	1	....	.....		.....	13	67	2	20	00
	2	77	2944	33	3	161	78	17	891	88	891	88	10	....	.....	.....	.....		.....	4	12	.....	.....	
	3	14	493	73	3	271	94	...	120	28	120	28	....	....	.....	.....	.....		.....	.....	33	.....	.....	
	4	181	7878	05	4	177	13	30	3051	64	3107	33	23	....	.....	.....	.....		.....	9	08	1	5	00
	5	99	4871	67	5	176	77	3	2205	45	2124	09	12	....	.....	1	11	00	.....	5	82	.....	.....	
	6	60	1628	25	4	407	99	3	722	03	722	03	3	....	.....	.....	.....		1	2	03	.....	.....	
	7	143	4357	60	5	200	31	11	1381	25	1281	47	6	....	.....	.....	12	00	.....	4	40	.....	.....	

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.		$	c.							$	c.		$	c.			
Brought forward.	124	21227	834539	07	1653	82886	88	2587	300746	23	28309	03	27571	76	1525	165	58	1	69	719	52	12	820	13	1311	17	157	60 00	960	75
LEEDS AND GRENVILLE	12	2077	66621	25	62	2960	73	218	28369	03	2761	76	13600	34	118	13	1	4		51	00	64	57	02	65	85	13			
LENNOX AND ADDINGTON	7	982	35049	87	46	2896	49	113	13812	76	1	1	83		9	1		1		23	00	1	39	45	.....		3	25 00		
Carried forward.	143	24286	936210	19	1761	88744	10	2918	342868	02	336950	08	1726		187		60		74	793	52	77	916	60	1377	02	173		1045	75

RETURN of Division Court Business.—*Continued.*

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				$	c.		$	c.		$	c.		$	c.						$	c.			$	c.			
LINCOLN	1	1	85	3318	27	8	468	89	14	1163	07	1100	13	4	.....	.....	.....	.....	.....	2	68	.....	.....	.....	.....	.....	.....	.....
	2	2	429	17757	17	30	916	47	65	4722	70	4864	60	46	4	.....	.....	.....	.....	20	44	.....	.....	.....	.....	6	36	00
	3	3	131	3923	70	14	776	78	6	2025	41	2047	10	13	1	.....	.....	.....	.....	5	50	.....	.....	.....	.....	.....	.....	.....
	4	4	65	3325	90	10	441	31	2	1990	77	2003	56	5	.....	.....	.....	.....	.....	3	20	.....	.....	.....	.....	.....	.....	.....
MIDDLESEX.....	1	2016	89519	18	59	3046	15	154	28011	53	28300	67	202	5	4	11	88	00	1	98	33	1708	78	20	142	00			
	2	280	10222	44	14	531	86	8	3150	30	3224	05	29	1	.....	2	19	00	.....	12	09	.....	.....	2	10	00		
	3	135	6511	67	28	1494	28	2	1966	50	1896	68	17	.....	7	.....	.....	.....	.....	6	86	.....	.....	4	35	00		
	4	55	1906	98	13	610	87	.....	587	69	577	69	3	.....	.....	1	12	00	.....	2	09	.....	.....	.....	.....	.....		
	5	172	8693	98	31	1933	18	25	2128	63	1978	67	26	1	.....	.....	.....	.....	.....	9	62	.....	.....	2	17	00		
	6	214	11847	27	27	1733	23	28	3825	16	3883	66	31	1	1	.....	.....	.....	.....	12	79	.....	.....	4	27	00		
	7	143	5403	83	17	485	42	10	1960	67	1879	80	12	.....	2	.....	.....	.....	.....	5	61	.....	.....	.....	.....	.....		
	8	77	3062	61	8	382	22	4	2072	99	2040	48	8	1	.....	1	12	00	.....	3	64	.....	.....	.....	.....	.....		
	9	175	4129	00	.....	.....	.....	18	1143	82	1185	29	5	.....	1	.....	.....	.....	.....	3	20	.....	.....	1	5	00		

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.		$	c.						$	c.		$	c.			
Brought forward	156	28263	1105832	19	2020	101564	86	3254	397617	26	391932	46	2127	201	78	89	924	52	79	1102	65	3065	80	212	1317	75
LINCOLN	4	710	28325	04	62	2603	45	87	9901	95	10015	39	68	5	3					31	82			6	36	00
MIDDLESEX	9	3267	141296	96	197	10217	31	249	44847	29	44966	99	333	9	15	15	131	00	1	154	23	1708	78	33	236	00
Carried forward	156	28263	1105832	19	2020	101564	86	3254	397617	26	391932	46	2127	201	78	89	924	52	79	1102	65	3065	80	212	1317	75

RETURN of Division Court Business.—*Continued.*

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				$	c.		$	c.		$	c.		$	c.					$	c.			$	c.			$	c.		$	c.
Muskoka	1	113	4852	58	19	873	09	6	1499	13	1536	48	6	1	3			1	12	00										
	2	127	5098	01	40	2352	39	32	1622	64	1558	30	3		1			1	12	00										
	3	82	2874	14	23	2106	90	3	911	41	892	41	2								2	22	00							
	4	19	607	06	4	135	48		325	57	325	57																		
Nipissing	1	25	894	08					525	00	525	00	1					1												
	2	189	6559	09	9	486	18	27	1976	45	1976	45	7	3	2			4												
	3	134	3846	17	15	799	00	2	1413	71	1366	71	91																	
	4	55	2776	38	9	602	94	1	1519	10	385	96	8																	
Norfolk	1	395	10152	60	59	202	57	59	4769	55	4777	56	16					1	12	00										
	2	176	5271	57	11	437	51	43	2925	12	2851	25	7	2				1	12	00										
	3	116	3052	47		255	54	25	1343	60	1346	67	3																	
	4	95	2674	69	14	504	35	13	1156	62	1073	42	5					2	22	00										
	5	103	3882	84	4	62	58	11	885	62	885	62	2																	
	6	198	4020	00	12	362	52		2046	21	1722	24	20	3				4												
	7	33	681	42	8	282	75	6	456	74	499	16		1																
	8	54	1884	40	11	428	36		507	64	507	64	5	9																

RETURN of Division Court Business.—*Continued.*

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Brought forward..	156	28263	1105832	19	2020	101564	86	3254	397617	26	391932	46	2127	201	78	89	924	52	79	1102	65	3085	80	212	1317	75
MUSKOKA.....	4	341	13421	79	86	5467	86	41	4358	75	4212	76	11	1	4									2	10	00
NIPISSING	4	403	14075	72	33	1888	12	30	5434	26	5254	12	107	3	2									8	23	00
NORFOLK.....	8	1170	31619	99	127	2536	18	157	14091	10	13463	56	58	16	4	4	46	00	1	32	25			7	43	00
Carried forward..	172	30177	1164949	69	2266	111457	02	3482	421501	37	414962	90	2303	221	88	93	970	52	80	1134	90	3085	80	229	1393	75

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				$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
NORTHUMBERLAND AND DURHAM...	1	262	1072 36	8	460 13	36	1579 62	1590 78	19			2	23 00		9 89		2	10 00
	2	152	5231 08	8	653 90	8	1515 14	1441 03	10		1				4 90		2	10 00
	3	254	8913 13	11	693 60	18	2193 38	2183 08	35						14 09		6	30 00
	4	214	8982 80	13	725 16	58	1885 98	1647 98	15	1		1	12 00		9 05		4	20 00
	5	291	12580 20	14	747 21	65	3454 80	3684 08	27	1	1	1	16 00	1	13 28		3	15 00
	6	65	3017 86	7	350 93	10	1473 64	1487 22	7	2		1	12 00		3 66		3	15 00
	7	144	3293 89	7	296 98	31	1810 76	1810 76	16	6							3	15 00
	8	267	10009 34	14	575 87	95	3297 51	3297 51	19	2			21 00		9 80		5	25 00
	9	214	8411 50	8	514 84	39	2763 05	2763 05	21	1		1	11 00		9 53		2	10 00
	10	154	4616 97	15	799 18	51	3285 59	3285 59	8	1					4 19		3	15 00
	11	297	11846 16	22	1130 46	10	3723 97	3723 97	26			1	12 00	1	12 91		1	5 00
ONTARIO.....	1	287	12687 60	24	1486 75	6	4010 65	4010 65	30	2		1	11 00		12 59		5	30 00
	2	215	6349 93	8	625 93	27	2250 97	2250 97	12	2					5 94		1	5 00
	3	267	14984 56	6	242 76	35	3501 86	3385 70	23	4					11 15		3	20 00
	4	365	12976 97	28	1937 06	85	4823 87	4731 30	20						11 78	32		
	5	170	6315 02	18	680 75	7	3011 47	2934 47	10	1		1	11 00		6 18		1	10 00
	6	80	4984 55	4	165 89	6	1534 97	1402 71	4	2		1	10 00		3 36		1	5 00
	7	43	1844 09	19	769 10	17	828 82	715 22	2	1		1	12 00		2 11			

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.		$	c.							$	c.			$	c.		$	c.
Brought forward..	190	33918	1303067	58	2500	124313	52	4086	468447	42	461221	96	2607	247	95	106	1121	52	82	1279	31	3086	12	274	1633	75
NORTHUMBERLAND AND DURHAM...	11	2314	77375	17	127	6948	26	421	26983	44	26828	04	203	14	3	9	107	00	2	91	30	.....		34	170	00
ONTARIO..... ...	7	1427	60142	72	107	5908	24	183	19962	61	19431	02	101	12	4	4	44	00	.....	53	11	32		11	70	00
Carried forward..	190	33918	1303067	58	2500	124313	52	4086	468447	42	461221	96	2607	247	95	106	1121	52	82	1279	31	3086	12	274	1633	75

RETURN of Division Court Business.—*Continued.*

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				$	c.		$	c.		$	c.		$	c.					$	c.			$	c.			$	c.	
OXFORD	1	794	25634	11	30	1358	34	233	10768	78	10671	97	52	2	.....	.....	.....	.....	1	21	00	1	26	66	161	32	33	00
	2	72	3009	49	23	1317	21	3	2625	47	2524	89	6	.....	.....	.....	.....	.....	.....	.....	.....	3	3	12	.....	.....	.....	.....
	3	148	6937	93	27	1684	88	14	773	08	711	08	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	70	.....	.....	10	00
	4	223	9053	32	18	712	44	36	2793	27	2770	21	29	1	.....	.....	1	11	00	.....	.....	.....	10	93	.....	.....	13	00
	5	561	21473	29	19	812	64	78	5446	94	5392	25	31	.....	.....	.....	2	10	00	.....	.....	.....	22	39	.....	.....	15	00
	6	232	7975	10	16	665	52	34	3977	38	3557	78	16	.....	.....	.....	1	9	00	.....	.....	.....	8	88	.....	.....	.....	.....
PARRY SOUND	1	94	2791	10	10	486	73	15	1400	75	1340	70	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	2	78	3037	88	11	709	86	11	870	06	870	06	4	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
	3	11	161	24	1	85	00	...	113	85	113	85	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	4	212	9343	37	33	2097	60	11	2729	80	2595	69	14	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
	5	50	2106	39	26	626	17	5	1021	19	1014	19	5	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	2	15	00
	6	63	2422	97	8	458	33	2	1013	98	981	63	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
PEEL.....	1	263	13633	81	21	1881	17	38	5112	33	4994	02	40	.....	.....	.....	1	11	00	.....	.....	.....	15	15	.....	.....	5	30	00
	2	151	3998	46	21	1188	89	9	1522	96	1385	33	10	.....	.....	.....	.....	8	00	.....	.....	.....	4	42	.....	.....	.....	.....
	3	60	2691	82	14	965	34	5	881	32	881	32	8	3	.....	.....	.....	.....	.....	.....	.....	.....	3	37	.....	.....	3	20	00
	4	137	5640	57	6	282	60	13	1194	42	1194	42	10	.....	.....	.....	2	12	00	.....	.....	.....	.....	.....	.....	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.	$	c.							$	c.			$	c.		$	c.
Brought forward.	190	33918	1303067	58	2500	124313	52	4086	468447	42	461221	96	2607	247	95	106	1121	52	82	1279	31	3086	12	274	1633	75
OXFORD.....	6	2030	74083	24	133	6551	03	398	26384	92	25628	18	152	1	1	12	91	00	4	79	68	181	32	12	71	00
PARRY SOUND	7	508	19862	95	89	4463	69	44	7149	63	6916	12	29	5	1	1	31	00	3	22	94	.....		2	15	00
PEEL.....	4	611	25964	66	62	4318	00	65	8711	03	8455	09	68	3	.....	3	31	00	.....	.....		.....		8	50	00
Carried forward.	207	37067	1422978	43	2784	139646	24	4593	510693	00	502221	35	2856	256	97	121	1243	52	89	1381	93	3267	44	296	1769	75

RETURN of Division Court Business.—*Continued.*

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				$ c.		$ c.		$ c.	$ c.									$ c.
PERTH	1	530	19034 31	37	1821 97	60	6582 64	6729 95	54	.....	.....	1	12 00	.....	21 47	37 61	7	45 00
	2	250	10271 82	32	1511 25	37	5009 84	5001 38	24	2	.....	1	9 00	1	10 82	.....	1	5 00
	3	309	11838 57	26	1508 46	22	4457 07	4403 57	28	.....	.....	6	45 00	.....	14 21	.....	1	5 00
	4	71	2271 00	4	341 60	1	1022 77	1010 16	3	.....	.....	.....	.....	.....	1 98	.....	.....	.....
	5	96	3245 27	3	122 73	3	1709 48	1693 68	6	1	.....	.....	.....	.....	3 36	.....	.....	.....
	6	297	9673 76	31	1525 32	62	3003 03	3017 77	18	.....	.....	1	22 00	1	9 53	.....	2	15 00
PETERBOROUGH ...	1	505	18888 51	18	844 98	32	5324 40	5324 40	42	.....	.....	2	26 00	.....	22 75	9 00	.....	.....
	2	145	4871 88	17	830 99	13	1775 64	1735 29	5	.....	.....	.....	.....	.....	3 89	.....	.....	.....
	3	16	658 88	1	15 62	...	132 41	165 89	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
	4	85	3699 23	6	274 63	2	1768 49	1768 49	8	.....	.....	2	23 00	.....	4 98	.....	.....	.....
	5	51	1191 23	1	315 59	9	142 54	142 54	.....	.....	.....	.....	.....	.....	69	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

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Brought forward.	207	37067	1422978 43	2784	139646 24	1593	510693 00	502221 35	2856	256	97	121	1243 52	89	1381 93	3267 44	296	1769 75
PERTH	6	1553	56334 73	133	6831 33	185	21784 83	21856 51	133	3	.....	9	88 00	1	61 37	37 61	11	70 00
PETERBOROUGH ...	5	802	29309 73	43	2281 81	56	9143 48	9136 61	57	.....	2	6	49 00	.....	33 08	9 00	.....	.....
Carried forward.	218	39422	1508622 89	2960	148759 38	1834	541621 31	533214 47	3046	259	99	136	1380 52	90	1476 38	3314 05	307	1839 75

RETURN of Division Court Business—*Continued.*

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				$	c.		$	c.		$	c.		$	c.						$	c.		$	c.			$	c.	
PRESCOTT AND RUSSELL	1	88	3612	71	.....	11	2010	75	8	1990	10	31	4164	93	24	.....	.....	1	12	00	3	65	.....	1	12	00
	2	48	1850	65	2	5	484	19	4	484	19	7	.....	.....	.....	.....	.....	.....	.....	.....	2	34	.....	.....	.....	.....
	3	90	2129	25	1	.....	550	11	2	550	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	94	.....	.....	.....	.....
	4	228	8122	55	14	.....	2596	98	14	2524	70	.....	.....	.....	1	.....	.....	.....	.....	.....	7	52	.....	1	5	00
	5	85	3248	86	66	4	1010	04	6	991	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	19	.....	.....	.....	.....
	6	86	2662	71	4	5	1074	63	3	1015	49	.....	.....	.....	2	.....	.....	.....	.....	.....	2	13	.....	.....	.....	.....
	7	38	814	39	1	8	194	58	3	182	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	96	.....	.....	1	10	00
	8	115	4306	45	3	4	1543	21	8	1561	70	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	95	.....	1	10	00
	9	216	6710	10	10	5	3777	41	8	3766	05	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	18	.....	.....	.....	.....
	10	71	1835	18	.....	.....	845	89	2	845	89	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	40	.....	.....	.....	.....
	11	112	4045	47	9	6	1420	90	7	1381	05	.....	.....	.....	.....	.....	.....	1	40	00	4	06	.....	6	40	00
PRINCE EDWARD	1	368	15730	12	11	19	4164	93	31	4164	93	7	.....	.....	.....	.....	.....	.....	.....	.....	14	20	.....	.....	.....	.....
	2	71	2685	96	5	4	1075	50	11	1115	74	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	92	.....	.....	.....	.....
	3	11	441	88	2	....	331	50	1	331	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	4	42	1195	17	6	....	736	49	2	736	49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49	.....	.....	.....	.....
	5	58	1921	23	5	3	612	39	6	622	39	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	46	.....	.....	.....	.....
	6	32	1263	72	1	1	227	59	4	227	59	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	51	.....	.....	.....	.....
	7	51	2807	98	6	2	640	46	9	640	46	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	82	.....	.....	.....	.....
	8	21	698	80	1	1	72	66	1	72	66	.....	.....	.....	.....	.....	.....	1	12	00	1	08	.....	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.		$	c.			$	c.		$	c.			$	c.	
Brought forward.	218	39422	1508622	98	2960	148759	38	4834	541621	31	533214	47	3046	259	99	136	1380	52	1476	38	3314	05	307	1839	75
PRESCOTT AND RUSSELL	11	1177	39638	32	110	2858	67	69	15508	69	15292	60	65	27	.....	1	12	00	36	32	.....		10	77	00
PRINCE EDWARD..	8	654	26744	86	37	2036	68	30	7861	52	7911	76	65	7	.....	1	12	00	27	37	.....		.....	.....	
Carried forward.	237	41253	1575006	07	3107	153654	73	4933	564991	52	556418	83	3176	293	99	138	1404	52	1540	07	3314	05	317	1916	75

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		1	141	$ c. 5630 07	1	$ c. 36 17	58	$ c. 1074 13	$ c. 935 74	8			3			1	10 00				
	RAINY RIVER.....	2	4	172 75	....	.....	....	.....	.....	....	.....	.....	.....	.....	.....	2	17 00	.....	.....	.....	.....
1		1	387	16079 04	20	946 46	58	5201 84	5201 84	43	1	1				3	26 96		3 90		48 00
2		2	70	2064 95	1	54 94	....	921 49	808 14	3	.....	.....	.....	.....	.....	.....	6 64	.....	.....	.....	7 00
3		3	193	8965 16	10	732 08	9	3754 32	3761 79	27	5	.....	.....	.....	.....	.....	7 05	.....	.....	.....	.....
4	RENFREW.....	4	169	6050 13	19	1026 18	6	2640 12	2637 17	8	.....	.....	.....	.....	.....	.....	11 97	.....	1 00	.....	7 00
5		5	35	1327 60	.....	.....	4	1042 89	1042 89	.....	.....	.....	.....	.....	.....	.....	10 03	4	.....	.....	.....
6		6	88	2519 18	3	137 67	5	925 92	971 86	2	.....	.....	.....	.....	.....	.....	23 51	.....	2 00	.....	8 00
7		7	73	1996 91	11	600 06	7	1287 67	1183 31	2	.....	.....	.....	.....	.....	.....	5 62	.....	.....	.....	.....
8		8	39	1485 86	4	330 58	4	574 17	574 17	2	.....	.....	.....	.....	.....	.....	14 52	.....	2 00	.....	11 00
1		1	402	18867 65	33	1998 66	82	5078 95	5094 21	44	3	.....	.....	.....	.....	1	10 00	.....	.....	.....	.....
2		2	134	5321 83	18	511 01	11	2541 89	2518 37	12	.....	.....	.....	.....	.....	2	17 00	.....	.....	.....	.....
3		3	270	8875 00	33	2023 72	57	5300 35	5266 35	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4		4	291	9835 71	35	2065 06	44	5608 47	5668 18	21	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5		5	221	9125 48	21	1137 77	32	3390 37	3390 37	21	4	.....	.....	.....	.....	2	28 00	4	.....	.....	.....
6		6	620	28277 02	30	1439 71	103	8990 37	8911 05	43	4	1	.....	.....	.....	2	21 00	.....	.....	.....	.....
7		7	150	5531 14	23	1130 27	19	1355 46	1371 79	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8		8	345	12109 99	29	1609 27	32	5788 72	5520 75	28	6	3	.....	.....	.....	1	10 00	.....	.....	.....	.....
9		9	256	9581 53	32	1511 68	19	2905 95	2732 81	10	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10		10	91	3882 92	7	325 58	8	1160 87	1102 23	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

RETURN of Division Court Business.—*Continued.*

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			$ c.		$ c.		$ c.	$ c.									
Brought forward.	237	41253	1575006 07	3107	153654 73	4933	564991 52	556418 83	3176	293	99	138	1404 52	91	1540 07	3314 05	1916 75
RAINY RIVER	2	145	5802 82	1	36 17	1	1074 13	935 74	8	.....	3	.....	.....	.....	.....	.....	.....
RENFREW	8	1054	40488 83	68	3827 97	93	16348 42	16181 17	87	9	1	8	86 00	4	41 11	6 32	23 00
SIMCOE.....	10	2780	106411 27	261	13752 73	407	42121 40	41576 11	208	20	4	8	86 00	4	109 82	86 85	74 00
Carried forward.	257	45232	1727708 99	3437	171271 60	5434	624535 47	615111 85	3479	322	107	146	1490 52	95	1691 00	3407 22	2013 75

RETURN of Division Court Business.—*Continued.*

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				$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
STORMONT, DUNDAS AND GLENGARRY.	1	1	212	5870 82	7	138 95	15	2564 12	2447 29	7						4 69			
	2	2	263	6338 52	5	245 48	7	2298 22	2239 15	12				8 00		8 03			
	3	3	621	18816 33	9	346 94	98	6205 30	6005 62	42	2					21 93	59 46	1	4 00
	4	4	151	4082 19	13	561 88	33	1235 89	1159 54	7	1					3 52		3	12 00
	5	5	232	6919 79	3		13	2224 28	2239 14	11						5 84		1	5 00
	6	6	149	2182 46	11	527 00	36	1579 41	1528 01	11	1					5 24		2	30 00
	7	7	87	2509 22	3	72 70	3	774 75	747 73	3	1					2 07			
	8	8	203	8259 58	17	780 39	8	3625 91	3683 50	8	2					6 65			
	9	9	117	4944 73	8	286 13	5	1029 21	979 71	9						4 47			
	10	10	161	4472 21	5	580 96	5	1599 13	1599 13	5	3					3 53			
	11	11	116	4091 35	9	431 03	2	846 74	845 84	7						4 15			
	12	12	41	1711 02	5	224 23	2	409 08	409 08	3						1 65			
THUNDER BAY	1	1	125	7055 44	10	425 19	7	2477 20	2381 87	12	1		1						
	2	2																	
	3	3	39	1466 28			1	512 52	426 47	2									

RETURN of Division Court Business.—*Continued.*

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				c.			c.			c.			c.														
Brought forward.	257	45232	1727708	99	3437	171271	60	5434	624535	47	615111	85	3479	322	107	146	1490	52	95	1691	00	3407	22	337	2013	75
STORMONT, DUNDAS AND GLENGARRY.	12	2553	70198	02	95	4195	69	227	24392	04	23883	74	125	10	2	1	8	00	.....	71	77	59	46	7	51	00
THUNDER BAY....	3	164	8521	72	10	425	19	8	2989	72	2808	34	14	1	1	.....	.....		.....	.....		.....		.....	.....	
Carried forward.	272	47939	1806428	73	3542	176892	48	5669	651917	23	641803	93	3618	333	110	147	1498	52	95	1762	77	3466	68	344	2064	75

RETURN of Division Court Business.—*Continued.*

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				$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
1	Victoria.....	1	80	2824 82	18	950 06	16	1496 66	1634 51	1	2					1 87	16 26		5 00
2		2	99	4289 91	8	321 42	4	768 17	875 62	7	1					3 85	4 52		5 00
3		3	39	1020 70	4	329 54	3	466 56	469 43	1						38	9 43	1	5 00
4		4	64	2140 41	3	228 72	3	662 44	653 63	4	2					1 93	5 82		
5		5	262	12760 05	20	1194 05	23	2571 96	2420 74	35	3					13 97	5 82	3	22 50
6		6	58	1750 61	12	648 83	1	992 63	9640 20	2	1					1 64	6 38		
7		7	101	3180 66	8	472 52	12	687 10	663 10	3		1				2 22	3 59		
1	Waterloo	1	436	16639 43	7	310 05	16	6165 41	6347 27	41	2					16 26	1 37	1	5 00
2		2	133	4289 64	13	404 58	3	1797 47	1742 04	8						4 52		1	5 00
3		3	317	9182 38	16	848 43	8	4261 97	4254 97	19						9 43		1	5 00
4		4	157	5703 45	2	170 50	2	1899 14	1899 14	12						5 82			
5		5	126	4864 05	3	116 17	4	1286 30	1307 56	13			1	11		6 38			
6		6	87	3140 70	7	402 73	4	1499 01	1379 07	7	1					3 22			
7		7	68	3066 80	4	170 55	6	1736 28	1736 28	8						3 59		2	9 00

RETURN of Division Court Business.—*Continued.*

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			$ c.		$ c.		$ c.	$ c.					$ c.		$ c.	$ c.		$ c.
Brought forward.	272	47339	1806428 73	3542	175892 48	5669	651917 23	641803 93	3618	333	110	147	1498 52	95	1762 77	3466 68	344	2064 75
VICTORIA.....	7	703	27967 16	73	4145 14	62	7645 52	7681 23	53	9	1	.....	.....	1	26 36	.....	5	37 50
WATERLOO	7	1324	46886 45	52	2423 01	43	18645 58	18666 33	108	3	.....	1	11	.....	49 22	1 37	5	24 00
Carried forward.	286	49366	1881282 34	3667	182460 63	5774	678208 33	668151 49	3779	345	111	148	1498 63	96	1838 35	3468 05	354	2126 25

RETURN of Division Court Business.—*Continued.*

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				$	c.		$	c.		$	c.		$	c.						$	c.				$	c.		
1	WELLAND	1	327	10845	36	10	713	68	64	4648	29	4631	29	19													
2		2	78	1821	51	9	319	73	19	1261	40	1197	63	1													
3		3	90	2753	23	6	232	97	14	1634	11	1554	05	3	1												
4		4	325	9790	03	11	650	38	22	5592	86	5338	89														
5		5	120	3281	46	7	389	62	7	1402	05	1372	05	2													
6		6	66	2493	16	1	24	92	4	1433	31	1353	06	7	2												
7																											
8																											
9																											
10	WELLINGTON	1	303	15433	25	18	767	97	33	4407	67	4467	06	47			1	8	00			18	19			26	00
11		2	25	873	79	3	45	95	3	262	99	262	99	1								1	03				
12		3	40	1412	11	10	649	30	1	644	75	437	80	2								1	82			5	00
13		4	194	8454	96	15	631	91	5	2641	51	2641	51	20								8	18			10	00
14		5	73	1427	02	9	584	25	6	1053	11	1063	66	3								2	13				
15		6	90	2703	84	4	85	31	7	975	31	975	31	6		1						2	76			15	00
16		7	31	1101	02	5	354	94	1	307	09	278	77	2	1								38				
17		8	236	7477	61	11	549	25	14	2579	98	2457	93	14			1	11	50			7	54				
18		9																									
19		10	172	8835	92	27	1546	58	19	2454	30	2296	06	26	2		2	17	00			11	28			5	00
20		11	257	11466	48	24	1471	95	17	4353	69	4400	60	28			4	22	00			14	31			15	00
21		12	135	7148	65	16	1011	09	10	2988	98	2976	72	20								8	03				

RETURN of Division Court Business.—*Continued.*

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			$	c.		$	c.		$	c.		$	c.							$	c.			$	c.		
Brought forward.	286	49966	1881282	34	3667	182460	63	5774	678208	33	668151	49	3779	32	3	.....	111	148	1498	63	96	1838	35	3468	05	369	2126	25
WELLAND	6	1006	30984	75	44	2331	30	130	15972	02	15466	97	32	.....	.....	.....	.....	.....	7	00	.....	26	55	.....			15	00	
WELLINGTON	12	1556	66354	65	142	7698	53	116	22669	38	22205	41	169	3	4	8	58	50	.....		76	25	.....			12	76	00
Carried forward.	304	52528	1978621	74	3853	192490	46	6020	716849	73	706823	87	3980	351	115	156	1564	13	96		1941	15	3468	05		369	2217	25

RETURN of Division Court Business—*Continued.*

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				$	c.		$	c.		$	c.		$	c.					$	c.			$	c.			$	c.		
WENTWORTH	1	659	30911	58	42	2408	17	41	10171	11	10206	34	55	1			9	00			24	70			83	47	4	22	00
	2	248	10151	84	13	378	10	3	2364	97	2259	00	28						1		10	87							
	3	43	1641	46	5	342	79	1	409	17	341	17	2																
	4	96	3140	10	12	1076	62	3	1924	34	1913	18	8								3	80							
	5	23	1025	56	3	245	10	3	387	47	387	47	1								1	00							
	6	62	3317	43	14	788	30	1	1336	45	1220	92	9								4	04							
	7	20	589	12	1	3	63	1	458	37	458	37	1									52							
	8	15	530	54	1	78	53	..	156	37	156	37	1	1			10	00			1	55					1	7	90
	9	578	24918	39	12	687	95	35	5366	89	5349	21	53	1			12	00	1		25	87			53	82	2	13	00
YORK	1	2551	111280	14	93	4328	15	752	29165	38	27866	54	246	19		6	58	00			114	37			1684	80	8	37	50
	2	207	10074	09	16	654	14	46	3284	24	3161	21	20								9	74					2	10	00
	3	89	3815	40	6	510	92	26	1749	78	1800	60	8								3	98							
	4	282	13931	30	35	2040	59	44	4437	45	4595	51	40	2		4					15	25					2	10	00
	5	112	4802	33	21	1070	06	5	2818	00	2899	79	12				1				5	10							
	6	189	7279	37	10	527	08	26	3681	77	3619	18	21			2	23	00			10	66							
	7	151	11085	27	5	247	50	11	4360	39	4327	64	48								14	73					1	10	00
	8	77	3069	76	5	112	24	7	1382	94	1382	94	2			1	10	00			3	19							
	9	82	2538	92	9	568	76	12	2007	78	1960	88	7	1							2	92							
	10	3177	145764	22	115	5834	72	897	29668	55	29525	84	300			4	11	59	00		140	74			2175	00	5	19	00

RETURN of Division Court Business.—*Concluded.*

THE NAME OF COUNTY, UNITED COUNTIES OR DISTRICT.	The number of Divisions, in each County, United Counties or District.	The number of Suits entered, exclusive of Transcripts of Judgments and Judgment Summonses, in each County, United Counties or District.	The amount of Claims entered, exclusive of Transcripts of Judgments and Judgment Summonses, in each County, United Counties or District.		The number of Transcripts of Judgments received from other Courts, in each County, United Counties or District.	The amount of Claims received by Transcripts of Judgments, from other Courts, in each County, United Counties or District.		The number of Judgment Summonses issued, in each County, United Counties or District.	The total amount of Suitors' money paid into Court, in each County, United Counties or District.		The total amount of Suitors' money paid out of Court, in each County, United Counties or District.		The number of Suits entered, where the amount claimed exceeds $100, in each County, United Counties or District.	The number of actions for Tort, where the amount claimed exceeds $40, in each County, United Counties or District.	The number of actions of Replevin, where the value of the goods or other property or effects distrained, taken or detained, exceeds the sum of $40, in each County, United Counties or District.	The number of Jury Trials by Juries summoned in each County, United Counties or District.	The amount paid to Jurors summoned, in each County, United Counties or District.		The number of "Jury Trials by Jurors called, in pursuance of Sec. 122 of "The Division Courts Act," in each County, United Counties or District.	The amount payable to Treasurer for "Division Court Jury Fund," in each County, United Counties or Districts.		The amount of Fees and Emoluments payable the Honourable the Treasurer for the use of the Province, in each County, United Counties or District.		The number of instances in which the Judge has allowed costs to be taxed for Counsel, Attorney or Agents' Fees, under Sec. 16 of "The Division Courts Act, 1880."	The amount of costs so taxed.	
			$	c.		$	c.		$	c.		$	c.						$	c.		$	c.			$	c.
Brought forward.	304	52528	1978621	74	3853	192490	46	7874	716849	73	706823	87	3980	351	3	115	2	156	1564	13	96	1941	15	3468	65	369	2217	25
WENTWORTH	9	1724	76229	02	103	6009	19	88	22575	14	22291	03	158	3	2	4	31	50	2	72	35	137	29	7	42	90
YORK	10	6917	313640	80	315	15894	16	1766	82556	28	81140	13	704	22	14	28	150	00	..	320	68	3859	80	18	86	50
Grand Totals.....	323	61169	2368491	56	4271	214383	81	7874	821981	15	810255	03	4842	376	131	188	1745	63	98	2334	18	7465	14	394	2346	65
Grand Totals, 1886	319	57803	2008528	50	3046	198213	50	8004	804544	88	790437	68	4551	338	118	203	1961	00	93	2249	28	6253	30	392	2440	00
Grand Totals, 1885	311	60391	2207142	47	4163	219010	55	8048	797050	88	823061	09	4553	287	109	225	2222	91	66	2399	47	6185	19	418	2742	77
Grand Totals, 1884	310	61552	2211167	20	4132	199229	07	7517	793207	01	785510	71	4675	243	104	332	2085	00	46	2319	30	4381	23	384	2832	00
Grand Totals, 1883	309	52768	1993086	65	3717	170834	49	6515	716718	26	698274	15	3891	388	92	184	1708	27	54	2001	54	3987	58	344	2321	55

TABLE B.

List of all the Division Court Clerks, their Post Office Address, the County and Number of Division in which their Courts are situated, for the Province of Ontario, up to 31st December, 1887, inclusive.

County.	No. of Division.	Name of Clerk.	Post Office Address.
Algoma	1	E. Biggings	Sault Ste. Marie.
	2	T. Collins	Bruce Mines.
	3	S. McLean	Little Current.
	4	W. S. Francis	Manitowaning.
	5	James Fraser	Gore Bay.
	6	A. T. Rose	Marksville.
Brant	1	Joseph Robinson	Brantford.
	2	John K. Finlanson	Paris.
	3	J. P. Galloway	St. George.
	4	Hy. Cox	Burford.
	5	J. R. Malcolm	Scotland.
	6	Thomas F. Simpson	Onondaga.
Bruce	1	Wm. Collins	Walkerton.
	2	H. B. O'Connor	Teeswater.
	3	Joseph Barker	Kincardine.
	4	N. McKechnie	Paisley.
	5	James McKinnon	Port Elgin.
	6	Hugh Murray	Underwood.
	7	A. Neelands	Invermay.
	8	James Walmsley	Wiarton.
	9	James McLeod	Ripley.
	10	W. Moshier	Lion's Head.
Carleton	1	J. R. Armstrong	Ottawa.
	2	H. Reilly	Richmond.
	3	Henry W. McDougall	Huntley.
	4	W. P. Taylor	Fitzroy Harbour.
	5	Charles G. Lindsay	Kars.
	6	Ira Morgan	Metcalf.
	7	F. W. Harmer	Hintonburgh.
Dufferin	1	Joseph Pattullo	Orangeville.
	2	Alexander McLachlan	Shelburne.
	3	J. A. Love	Stanton.
	4	James Henry	Mono Mills.
	5	R. E. Hamilton	Grand Valley.
Elgin	1	A. Love	Aylmer.
	2	Charles Askew	St. Thomas.
	3	Charles Askew	St. Thomas.
	4	F. McDiarmid	West Lorne.
Essex	1	James A. Stewart	Sandwich.
	2	J. H. C. Leggatt	Amherstburg.
	3	E. Allworth	Kingsville.
	4	C. Bell	Oxley.
	5	George A. Morse	Leamington.
	6	F. P. Boutellier	Belle River.
	7	John McCrae	Windsor.
	8	John Milne	Essex Centre.

List of all the Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Frontenac	1	Wm. Robinson	Kingston.
	2	P. McKim	Kingston.
	3	C. Ruttan	Sydenham.
	4	A. Grant	Verona.
	5	John McGrath	Sunbury.
	6	Jesse Shibley	Sharbot Lake.
Grey	1	Benjamin Allen	Owen Sound.
	2	David Jackson, jr	Durham.
	3	Thomas Plunkett	Meaford.
	4	T. J. Rorke	Heathcote.
	5	J. W. Armstrong	Flesherton.
	6	John McDonald	Chatsworth.
	7	Duncan Campbel'	Hanover.
	8	Wm. Brown	Markdale.
Haldimand	1	D. McGregor	Caledonia.
	2	W. Mussen	Cayuga.
	3	T. Armour	Dunnville.
	4	R. A. Havill	Rainham.
	5	S. K. Smith	Canboro'.
	6	C. E. Bourne	Jarvis.
Haliburton	1	C. D. Curry	Minden.
	2	Wm. Prust	Haliburton.
Halton	1	Wm. Panton	Milton.
	2	R. Balmer	Oakville.
	3	Lachlan Grant	Georgetown
	4	J. Matthews	Acton.
	5	S. R. Lister	Campbellville.
	6	Gilbert C. Bastedo	Burlington.
Hastings	1	R. D. C. Hulme	Belleville.
	2	D. R. Ketcheson	Wallbridge.
	3	A. B. Randall	Shannonville.
	4	T. McCann	Tweed.
	5	F. B. Parker	Stirling.
	6	J. S. Loomis	Madoc.
	7	A. S. Valleau	Deseronto.
	8	J. Sills	Canifton.
	9	James B. Young	Trenton.
	10	Marcus H. Powell	Marmora.
	11	James E. Harrison	Bridgewater.
	12	J. Wilson	L'Amable.
Huron	1	J. S. McDougall	Goderich.
	2	John Beattie	Seaforth.
	3	W. W. Farran	Clinton.
	4	A. Hunter	Brussels.
	5	T. Trivitt	Exeter.
	6	Wm. McArthur	Dungannon.
	7	John Morgan	Bayfield.
	8	James McGuire	Wingham.
	9	Joseph Cowan	Wroxeter.
	10	M. Zeller	Zurich.
	11	Wm. Lewis	Crediton.
	12	Myles Young	Blyth.

List of all the Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Kent	1	W. B. Wells, jr	Chatham.
	2	J. Duck	Ridgetown.
	3	S. Wallace	Dresden.
	4	Malcolm Samson	Blenheim.
	5	D. C. McDonald	Wallaceburg.
	6	George Moore	Bothwell.
	7	D. R. Farquharson	Fletcher.
Lambton	1	H. M. Pousett	Sarnia.
	2	Wm. McLeay	Watford.
	3	W. Webster	Florence.
	4	P. Cattanach	Sombra.
	5	T. R. K. Scott	Forest.
	6	T. Kirkpatrick	Thedford.
	7	John McRae	Mooretown.
	8	W. G. Fraser	Petrolea.
	9	Richard Code	Alvinston.
Lanark	1	R. Jamieson	Perth.
	2	W. A. Field	Lanark.
	3	F. McEwen	Carleton Place.
	4	W. M. Keith	Smith's Falls.
	5	Alex. Graham	Pakenham.
	6	Wm. P. McEwen	Almonte.
Leeds and Grenville	1	D. B. Jones	Brockville.
	2	B. White	Prescott.
	3	S. McCammon	Gananoque.
	4	Oliver Bascom	Kemptville.
	5	E. H. Whitmarsh	Merrickville.
	6	W. H. Denaut	Delta.
	7	H. McCrea	Frankville.
	8	H. Kilborn	Newboro'.
	9	R. B. Alguire	Farmersville.
	10	G. Fairbairn	Spencerville.
	11	J. B. Bellamy	North Augusta.
	12	M. J. Connolly	Caintown.
Lennox and Addington	1	George D. Hawley	Napanee.
	2	C. L. Rogers	Bath.
	3	J. J. Watson	Adolphustown.
	4	P. Johnstone	Camden East.
	5	W. Whelan	Centreville.
	6	J. A. Zimmerman	Odessa.
	7	James Aylsworth	Tamworth.
Lincoln	1	James B. Secord	Niagara.
	2	W. A. Mittleberger	St. Catharines.
	3	Isaac Springstead	Smithville.
	4	C. E. Riggins	Beamsville.
Middlesex	1	W. J. McIntosh	London.
	2	William Dickson	Parkhill.
	3	J. Flanagan	Clandeboye.
	4	C. J. Fox	Delaware.
	5	G. Wilson	Glencoe.
	6	J. English	Strathroy.
	7	Isaac N. Burdick	Dorchester Station.
	8	B. E. Sifton	Arva.
	9	E. S. Jarvis	London.

List of all the Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Muskoka	1	T. M. Bowerman	Bracebridge.
	2	J. H. Jackson	Severn Bridge.
	3	J. R. Reece	Huntsville.
	4	R. G. Penson	Port Carling.
Nipissing	1	J. D. Cockburn	Sturgeon Falls.
	2	John McMeekin	Mattawa.
	3	John G Cormack	North Bay.
	4		Sudbury.
Norfolk	1	W. R. Griffin	Simcoe.
	2	Ed. Matthews	Waterford.
	3	R. Green	Windham Centre.
	4	C. S. Harris	Courtland.
	5	M. J. McCall	Vittoria.
	6	S. P. Mabee	Port Rowan.
	7	D. C. Brady	Houghton.
	8	Lawrence Skey	Port Dover.
Northumberland and Durham	1	F. Cubitt	Bowmanville.
	2	S. Wilmot	Newcastle.
	3	G. M. Furby	Port Hope.
	4	John Hunter	Millbrook.
	5	A. G. Boswell	Cobourg.
	6	H. Lawless	Grafton.
	7	Martin H. Peterson	Colborne.
	8	M. P. Ketchum	Brighton.
	9	R. P. Hurlburt	Warkworth.
	10	T. R. Garrett	Wooler.
	11	D. Kennedy	Campbellford.
Ontario	1	D. C. Macdonell	Whitby.
	2	M. Gleeson	Greenwood.
	3	J. W. Burnham	Port Perry.
	4	Z. Hemphill	Uxbridge.
	5	Geo. Smith	Cannington.
	6	G. F. Bruce	Beaverton.
	7	F. J. Gillespie	Uptergrove.
Oxford	1	F. W. Macqueen	Woodstock.
	2	M. F. Ainsley	Drumbo.
	3	Robert Murray	Embro.
	4	Jas. Barr	Norwich.
	5	James Stevens	Ingersoll.
	6	J. Hodgson	Tilsonburgh.
Parry Sound	1	R. H. Stewart	Parry Sound.
	2	H. Armstrong	McKellar P. O.
	3	E. Sirett	Rosseau.
	4	James Sharpe	Burk's Falls.
	5	J. G. Best	Maganetawan.
	6	R. B. Maw	Commanda.
	7	Benjamin McDermott	Sundridge.

List of all the Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Peel	1	J. W. Main	Brampton.
	2	Thomas K. Beaty	Streetsville.
	3	John Harris	Caledon.
	4	F. W. Bolton	Bolton.
Perth	1	D. B. Burritt	Stratford.
	2	George K. Matheson	Mitchell.
	3	E. Long	St. Marys.
	4	G. Brown	Shakespeare.
	5	Thomas Trow	Milverton.
	6	W. J. Hay	Listowell.
Peterborough	1	R. W. Errett	Peterborough.
	2	Thomas Fraser	Norwood.
	3	T. Campbell	Keene.
	4	S. Sherin	Lakefield.
	5	C. R. D. Booth	Apsley.
Prescott and Russell	1	David Buchan	L'Orignal.
	2	John Shields	Vankleek Hill.
	3	W. Allison	Stardale.
	4	Thomas A. Van Bridger	Plantagenet.
	5	J. S. Cameron	Cumberland.
	6	A. Carson	Russell.
	7	R. Lawlor	Hawkesbury.
	8	J. Downing	Fournier.
	9	F. W. Langrell	Alfred.
	10	P. D. McDonald	Rockland.
	11	Peter Stewart	Grant.
Prince Edward	1	Robert Boyle	Picton.
	2	Hy. Hulett Haight	Milford.
	3	I. Hamilton	Demorestville.
	4	William C. Delong	Ameliasburg.
	5	J. B. Garratt	Wellington.
	6	A. B. Saylor	Bloomfield.
	7	J. M. Cadman	Consecon.
	8	B. E. Harrison	Waupoos.
Rainy River	1	P. H. Clark	Rat Portage.
	2	William Wilson	Fort Francis.
Renfrew	1	W. C. Irving	Pembroke.
	2	Hugh R. Dunn	Beachburg.
	3	George Eady, jr	Renfrew.
	4	George E. Neilson	Arnprior.
	5	John Barnard	Shamrock.
	6	James Reeves	Eganville.
	7	Robert Allen	Cobden.
	8	J. C. Gurney	Rockingham.

List of all the Division Court Clerks, etc.—*Continued.*

County.	No. of Division.	Name of Clerk.	Post Office Address.
Simcoe	1	A. J. Lloyd	Barrie.
	2	H. W. Manning	Bradford.
	3	Joel Rogers	Beeton.
	4	R. G. Campbell	Collingwood.
	5	A. Craig	Craighurst.
	6	J. P. Henderson	Orillia.
	7	J. A. Mather	New Lowell.
	8	J. G. Hood	Alliston.
	9	Harry Jennings	Penetanguishene.
	10	J. C. Steele	Coldwater.
Stormont, Dundas and Glengarry	1	G. H. McGillivray	Williamstown.
	2	C. D. Chisholm	Alexandria.
	3	C. J. Mattice	Cornwall.
	4	Asaph Dawson	Dickenson's Landing.
	5	Wm. Garvey	Morrisburg.
	6	J. N. Tuttle	Iroquois.
	7	W. J. Ridley	South Mountain.
	8	J. A. Cockburn	Crysler.
	9	Duncan C. McRae	North Lancaster.
	10	W. Rae	Chesterville.
	11	D. McIntosh	Monckland.
	12	J. R. McKenzie	Skye.
Thunder Bay	1	John Munro	Port Arthur.
	2	John Aikins	English River.
	3	Wm. McLean	Fort William.
Victoria	1	John Gunn	Woodville.
	2	G. Cunningham	Fenelon Falls.
	3	Irvine Junkin	Bobcaygeon.
	4	James D. Thornton	Omemee.
	5	O. J. McKibbin	Lindsay.
	6	J. F. Cunnings	Oakwood.
	7	A. C. Graham	Victoria Road.
Waterloo	1	A. J. Peterson	Berlin.
	2	Otto Klotz	Preston.
	3	Thomas Field	Galt.
	4	W. D. Watson	Ayr.
	5	J. Allchin	New Hamburg.
	6	R. Morrison	Hawkesville.
	7	J. L. Wideman	St. Jacobs.
Welland	1	G. L. Hobson	Welland.
	2	Paul J. Wilson	Marshville.
	3	T. Newbigging	Fort Erie.
	4	J. A. Orchard	Niagara Falls, South.
	5	John J. Gearin	Thorold.
	6	A. K. Schofield	Port Colborne.

List of all the Division Court Clerks, etc.—*Concluded.*

County.	No. of Divisions.	Name of Clerk.	Post Office Address.
Wellington	1	A. A. Baker	Guelph.
	2	William Nicoll	Morriston.
	3	D. L. Schultz	Rockwood.
	4	T. W. Thomson	Fergus.
	5	W. Tyler	Erin.
	6	Hugh Hamilton	Elora.
	7	G. Allan	Glenallan.
	8	Daniel Driscoll	Arthur.
	9	Joseph Pattullo	Orangeville.
	10	A. C. R. Saunders	Harriston.
	11	J. C. Wilkes	Mount Forest.
	12	L. R. Adams	Drayton.
Wentworth	1	H. T. Bunbury	Hamilton.
	2	F. D. Suter	Dundas.
	3	Hugh Thompson	Waterdown.
	4	W. McDonald	Rockton.
	5	A. G. Jones	Stoney Creek.
	6	L. A. Gurnet	Ancaster.
	7	J. McClement	Glanford.
	8	Samuel C. Wright	Binbrook.
	9	R. L. Gunn	Hamilton.
York	1	A. McL. Howard	Toronto.
	2	J. Stephenson	Unionville.
	3	J. M. Lawrence	Richmond Hill.
	4	D. Lloyd	Newmarket.
	5	Warren P. Cole	Sutton, West.
	6	A. Armstrong	Lloydtown.
	7	John Nattress	Woodbridge.
	8	John Paule	Weston.
	9	J. H. Richardson	West Hill.
	10	E. H. Duggan	Toronto.

TABLE C.

List of all the Division Court Bailiffs, their Post Office Address, the County and Number of Division in which their Courts are situated, for the Province of Ontario, up to 31st December, 1887, inclusive.

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Algoma	1	Robert Rush	Sault Ste. Marie.
	2	James Mills	Bruce Mines.
	3	D. McKenzie	Little Current.
	4	J. Gorley	Manitowaning.
	5	E. H. Jackson	Gore Bay.
	6	Daniel McPhail	Marksville, St. Jos. Is.
Brant	1	Joseph Jackson	Brantford.
	2	A. Huson	Paris.
	3	G. S. Waite	South Dumfries.
	4	Joseph H. Jackson	Brantford.
	5	Charles Wheeland	Scotland.
	6	Matthew Day	Onondaga.
Bruce	1	M. Thompson	Walkerton.
	2	P. Corrigan	Holywood.
		John Farquharson	Teeswater.
	3	Alex. Campbell	Kincardine.
	4	W. W. Hogg	Paisley.
	5	M. Hunter	Port Elgin.
	6	Gore Leggett	Underwood.
	7	John D. White	Invermay.
	8	H. Trout	Wiarton.
	9	Donald McDonald	Ripley.
	10	Edward Barley	Lion's Head.
Carleton	1	R. Hamilton	Ottawa.
		John Whitton	Ottawa.
	2	John Reilly	Richmond.
	3	John Reilly	Richmond.
	4	W. A. Shirreff	Fitzroy Harbor.
	5	Chas. C. Whale	Manotick.
	6	John Eastman	Osgoode.
	7	A. Wilson	Hintonburgh.
Dufferin	1	James McQuarrie	Orangeville.
	2	E. F. Bowes	Shelburne.
	3	A. Cauthers	Stanton.
	4	James McQuarrie	Orangeville.
	5	Robert Beales	Grand Valley.
Elgin	1	W. W. White	Aylmer.
	2	Henry Thornton	St. Thomas.
	3	Henry Thornton	St. Thomas.
	4	John McCallum	West Lorne.
Essex	1	Allois Master	Sandwich.
	2	William Kelly	Amherstburg.
		C. Wright	Amherstburg.
	3	George Malott	Kingsville.
	4	G. Pearce	Harrow.
	5	J. McGaw	Leamington.
		Jesse T. Brown	Leamington.
	6	William Mann	Comber.
	7	A. Botsford	Windsor.
		J. S. Askew	Windsor.
	8	Richard E. Millard	Essex Centre.

List of all the Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Frontenac	1	M. Furlong	Wolfe Island.
		J. A. Gardner	Kingston.
	2	John A. Gardner	"
	3	James Cosgrove	Oates.
	4	M. W. Price	Mountain Grove.
		Henry Sly	Verona,
		Samuel Mitchell	Plevna.
	5	Samuel Mitchell	Plevna.
		William J. Arthur	Battersea.
	6	Thomas B. Campbell	Oso Station
		Matthew W. Price	Mountain Grove.
		Harmon W. Hunt	Sharbot Lake.
Grey	1	Robert Edgar	Owen Sound.
	2	James Carson	Durham.
	3	Andrew Watt	Meaford.
	4	George Mitchell	Clarksburg.
	5	A. S. Vandusen	Flesherton.
	6	W. B. Simpson	Chatsworth.
	7	John Small	Hanover.
	8	W. G. Pickell	Markdale.
Haldimand	1	E. J. Wigg	Caledonia.
	2	Andrew Finlan	Cayuga.
	3	J. Clemow	Dunnville.
	4	David Byers	Selkirk.
	5	E. W. Robins	Canboro'.
	6	F. Hartwell	Jarvis.
Haliburton	1	R. C. Garratt	Minden.
	2	John Stothart	Haliburton.
Halton	1	J. A. Frazer	Milton.
	2	John Weir	Oakville.
	3	Alfred Benham	Georgetown.
	4	William Hemstreet	Acton.
	5	E. Chapman	Campbellville.
	6	J. W. Henderson	Burlington.
Hastings	1	Peter Maybee	Belleville.
		George W. Sills	Belleville.
	2	J. E. Bleeker	Frankford.
	3	W. E. Pearsall	Shannonville.
	4	W. J. Bowell	Tweed.
	5	C. Butler	Sterling.
	6	John Allen Huff	Madoc.
	7	J. L. Furguson	Deseronto.
	8	D. Phillips	Foxboro'.
	9	L. Cruickshank	Trenton.
	10	James C. Bowen	Marmora.
	11	James Mairs	Bridgewater.
	12	Walter Mullett	Bancroft.
Huron	1	John Knox	Goderich.
	2	Joseph P. Brine	Seaforth.
	3	D. Dickenson	Clinton.
	4	Finlay S. Scott	Brussels.
	5	John Gill	Exeter.
	6	Joseph Mallough	Dungannon
	7	J. Ferguson	Bayfield.
	8	Francis Patterson	Wingham.
	9	John Brethauer	Wroxeter.
	10	Ed. Bossenberry	Zurich.
	11	J. Beanes	Crediton.
	12	William Campbell	Blyth.

List of all the Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Kent	1	Charles J. Moore	Chatham.
	1	T. H. Nelson	Chatham.
	2	Wm. Teetzel	Ridgetown.
	3	John Gillespie	Dresden.
	4	W. R. Fellows	Blenheim.
	4	John A. Little	Blenheim.
	5	Thomas Forham	Wallaceburgh.
	6	H. F. Smith	Bothwell.
	6	S. J. Thomas	Bothwell.
	7	M. Dillon	Merlin.
Lambton	1	Robert Miller	Sarnia.
	2	J. F. Elliott	Watford.
	3	Richard L. Bobier	Florence.
	4	N. Cornwall	Sombra.
	5	Eugene Mason	Wyoming.
	6	J. G. Braddon	Thedford.
	7	John McGill	Corunna.
	8	John Sinclair	Petrolia.
	9	W. Fitzpatrick	Alvinston.
Lanark	1	James Patterson	Perth.
	2	Robert Watt	Lanark.
	3	John McPherson	Carleton Place.
	4	H. D. Chalmers	Smith's Falls.
	5	Thomas Somerton	Pakenham.
	6	John Slattery	Almonte.
Leeds and Grenville	1	H. McPhall	Brockville.
	1	Uri Marshall	Brockville.
	2	J. Jenkisson	Prescott.
	3	Edw. McE. Hiscocks	Gananoque.
	4	J. Dickinson	Kemptville.
	5	P. Dowdall	Merrickville.
	6	W. H. Denaut, jr	Delta.
	6	S. R. Ransom	Delta.
	7	R. Richards	Frankville.
	8	Chester Stuart	Newboro'.
	8	W. S. Bilton	Westport.
	9	G. W. Brown	Farmersville.
	10	Wm. Still, jr	Spencerville.
	10	David P. Synder	Spencerville.
	11	S. J. Whaley	North Augusta.
	12	W. J. Mallory	Mallorytown.
Lennox and Addington	1	Z. Ham	Napanee.
	2	R. R. Fmkle	Bath.
	3	D. Daverne	Adolphustown.
	4	Z. Ham	Napanee.
	5	P. Vandewater	Centreville.
	6	John W. Denyes	Odessa.
	7	P. F. Carscallen	Tamworth.
	7	Dennis Craigen	Cloyne.
	7	Andw. Cowan	Vennachar.

List of all the Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Lincoln	1	P. Henigan	Niagara.
	2	J. S. Clement	St. Catharines.
	3	A. D. Lacey	Smithville.
	4	F. B. Rodgers	Beamsville.
Middlesex	1	John Burns	London East.
	2	Edward Manes	Parkhill.
	3	G. W. Hodgins	McGillivray.
	4	J. Fitzallen	Delaware.
	5	James A. Watterworth	Glencoe.
	6	Thomas O. Curry	Strathroy.
	7	John Beverly	Dorchester Station.
	8	Wm. H. Brock	Arva.
	9	Isaac Nixon	London East.
Muskoka	1	W. J. Hill	Bracebridge.
	2	T. M. Robinson	Gravenhurst.
	3	C. Peacock	Huntsville.
	4	Roger Mahon	Port Carling.
Nipissing	1	H. Kinch	Sturgeon Falls.
	2	X. Ranger	Mattawa.
	3	Wesley Coleman	North Bay.
	4	Wm. Irving	Sudbury.
Norfolk	1	E. G. Wells	Simcoe.
	2	Edward Grace	Waterford.
	3	D. C. Wood	Simcoe.
	4	Robert Power	Delhi.
	5	A. Wood	Vittoria.
	6	Henry C. Ellis	Port Rowan.
	7	H. J. Mitchener	Clear Creek.
	8	Hiram Fairchild	Port Dover.
Northumberland and Durham	1	John McDougall	Bowmanville.
	2	N. A. Jerome	Orono.
	3	Thomas Orr Monaghan	Port Hope.
	4	Wm. Carveth	Millbrook.
	5	O. Dean	Cobourg.
	6	Thomas Patterson	Grafton.
	7	John Reives	Colborne.
	8	Wm. Martin	Brighton.
	9	David Robertson	Warkworth.
	10	W. H. Richards	Wooler.
	11	Robert Cook	Campbellford.
Ontario	1	J. W. Palmer	Whitby.
	2	Levi Mackey	Greenwood.
	3	James D. Paxton	Port Perry.
	4	J. C. Widdifield	Uxbridge.
	5	R. J. Harwood	Cannington.
	6	James C. Edgar	Beaverton.
	7	Joseph Fox	Millington.

List of all the Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Oxford	1	M. Virtue	Woodstock.
	2	L. S. Kennedy	Richwood.
	3	Geo. C. McKay	Embro.
	4	Wm. Stroud	Norwich.
	5	James Brady	Ingersoll.
	6	M. Dillon	Tilsonburgh.
Parry Sound	1	T. W. George	Parry Sound.
	2	W. J. Moffatt	McKellar.
	3	Frank Wing	Rosseau.
	4	Archibald Menzies	Burke's Falls.
	5	William E. Kennedy	Magnetawan.
	6	David Ricker	Gurd Township.
	7	Daniel Gummett	Sundridge.
Peel	1	William Broddy	Brampton.
	2	R. Irwin	Streetsville.
	3	James K. Leslie	Caledon.
	4	J. C. Switzer	Albion.
Perth	1	Thomas Tobin	Stratford.
		Thomas S. Tobin	Stratford.
	2	J. S. Coppin	Mitchell.
	3	William Box	St. Mary's.
	4	J. W. Donaldson	Shakespeare.
	5	John J. Whaley	Milverton.
	6	Robert Hay	Listowel.
Peterboro'	1	Chas. Stapleton	Peterboro'.
	2	A. R. Anderson	Norwood.
	3	Joseph Elmhirst	Keene.
	4	R. Chapin	Lakefield.
	5	Alexander Graham	Clanricarde.
Prescott and Russell	1	George Gale	L'Orignal.
	2	Thomas Shields	Vankleek Hill.
	3	P. Kelly	St. Eugene.
	4	Wm. Adolphus McKay	Plantaganet.
	5	Docitte Lavergne	Cumberland.
	6	Thomas Young	Russell.
	7	M. Costello	L'Orignal.
	8	C. Gates	Fournier.
		Victor Leger	St. Isadore.
	9	Jules Boileau	Alfred.
	10	John A. Dent	Rockland.
	11	E. M. Casselman	Casselman.
Prince Edward	1	A. M. Buchanan	Picton.
	2	Marshall Palen	Milford.
	3	Edward R. Nixon	Demorestville.
	4	A. Harvey	Ameliasburg.
	5	Thos. Jackson	Wellington.
	6	Alex. McDonald	Hallowell.
	7	Harman W. Weeks	Consecon.
	8	E. A. Williams	Waupoose.

List of all the Division Court Bailiffs, etc.—*Continued.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Rainy River	1	W. H. McKay	Rat Portage.
	2	W. Lindsay	Fort Francis.
Renfrew	1	George Mitchell	Pembroke.
		James Millar	Pembroke.
	2	A. Acheson	Westmeath.
	3	S. O'Gorman	Renfrew.
	4	Wm. Wilson	Arnprior.
		John Lyon	Arnprior.
	5	John Hughes	Dacre.
	6	Hugh Gallagher	Eganville.
	7	Geo. Marshall	Cobden.
	8	John Hartney	Rockingham.
Simcoe	1	John Weaymouth	Barrie.
	2	L. Algeo	Bradford.
	3	S. H. Washburn	Beeton.
	4	A. W. S. Cunningham	Collingwood.
	5	James Martin	Hillsdale.
	6	J. G. Wilson	Orillia.
	7	John Orr, jr	New Lowell.
	8	F. M. Woolcock	Alliston.
	9	A. Sneath	Penetanguishene.
	10	Thomas Blaney	Coldwater.
Stormont, Dundas and Glengarry	1	J. A. Robertson	Lancaster.
	2	S. R. McLeod	Alexandria.
	3	D. McDonald	Cornwall.
	4	H. Bush	Lunenberg.
		L. Warner	Osnabruck Centre.
	5	Jacob Hopper	Morrisburg.
	6	Wm. A. Coons	Iroquois.
	7	A. Redmond	Inkerman.
	8	Samuel Dillobough	Crysler.
	9	J. A. Robertson	Lancaster.
	10	A. Stallmayer	Chesterville.
	11	Martin Malony	Monckland.
	12	S. R. McLeod	Alexandria.
Thunder Bay	1	James Meek	Port Arthur.
	2	Joseph McKinnon	English River.
	3	P. F. McCallum	Fort William.
Victoria	1	Alexander B. McLean	Woodville.
	2	John Austin	Fenelon Falls.
	3	Thos. Cheetham	Bobcaygeon.
	4	George A. Balfour	Omemee.
	5	John Matthie	Lindsay.
	6	Wm. Henry McLaughlin	Oakwood.
	7	William Boden	Victoria Road.
Waterloo	1	J. Klippert	Berlin.
	2	John Kirkpatrick	Galt.
	3	John Kirkpatrick	Galt.
	4	E. Bourchier	Washington.
	5	Alex. Fraser	New Hamburgh.
	6	Benj. J. Ballard	Hawkesville.
	7	Benj. J. Ballard	Hawkesville.

List of all the Division Court Bailiffs, etc.—*Concluded.*

County.	No. of Division.	Name of Bailiff.	Post Office Address.
Welland	1	Casper Ramey	Welland.
	2	Vernon H. Robinson	Marshville.
	3	George Graham	International Bridge.
	4	J. D. Fralick	Niagara Falls, South.
	5	Lanson Theal	Thorold.
	6	A. Boyer	Port Colborne.
Wellington	1	P. Spragge	Guelph.
	2	J. H. Doughty	Aberfoyle.
	3	Wm. Hemstreet	Acton.
	4	Archibald McMillan	Fergus.
	5	James Broddy	Erin.
	6	Wm. Findlay	Elora.
	7	George Mellis	Glenallan.
	8	David T. Small	Arthur.
	9	James McQuarrie	Orangeville.
	10	J. Livingston	Harriston.
	11	A. Godfrey	Mount Forest.
	12	S. B. Trask	Drayton.
Wentworth	1	Wm. Hunter	Hamilton.
	2	F. P. Hanes	Dundas.
	3	John Graham	Waterdown.
	4	Emerson Clement	Troy.
	5	S. Springsted	Stoney Creek.
	6	F. P. Hanes	Dundas.
	7	A. de C. Boyes	Binbrook.
	8	A. de C. Boyes	Binbrook.
	9	J. Greenfield	Hamilton.
York	1	J. M. Wingfield	Parkdale.
		St. John Severs	Toronto.
	2	James Stewart	Toronto.
	3	James Stewart	Toronto.
	4	Wm. Malloy	Newmarket.
	5	R. A. Sheppard	Sutton West.
	6	James W. Crossley	Lloydtown.
	7	James Stewart	Toronto.
	8	James Stewart	Toronto.
	9	W. Luke	West Hill.
	10	Peter Small	Toronto.

TABLE D.

DIVISION COURTS AND THE LIMITS OF THE RESPECTIVE DIVISIONS IN THE PROVINCE OF ONTARIO.

DISTRICT OF ALGOMA.

1.—Bounded west by Thunder Bay District, 87th parallel of west longitude, and east by Barr River, including all the islands in front.

2.—Bounded west by Barr River, and east by Serpent River.

3.—Bounded west by Serpent River, and east by the eastern boundary of the District, including that part of the Island of Manitoulin lying north of the line between the 6th and 7th concessions of the Township of Sheguindah, the 4th and 5th concessions of the Township of Bidwell, and the 6th and 7th concessions to the line between lots number 17 and 18 in the Township of Billings, together with all the islands in front, except Barrie Island and that part of Manitoulin not described as above.

4.—Consisting of all that part of Manitoulin lying east of Manitowaning and South Bays, and south of the line between the 6th and 7th concessions of Sheguindah, and 4th and 5th concessions of Bidwell, the 6th and 7th concessions of Billings to the line between lots 17 and 18, thence southerly along said line to Lake Mindemoya, thence south-westerly along the shore of the said lake to the town line between Billings and Carnarvon, thence westerly along the said line and through the Township of Campbell, between the 6th and 7th concessions to the westerly boundary thereof, thence southerly along said boundary to the shores of Lake Huron.

5.—Being composed of all that part of Manitoulin Island not contained in Divisions 3 and 4, and of Barrie Island.

6.—Consisting of St. Joseph's Island and Cockburn Island.

COUNTY OF BRANT.

1.—The City of Brantford, and that part of the Township of Brantford not included in the other Divisions hereinafter described.

2.—The Town of Paris, and that part of South Dumfries west of the line between lots 18 and 19, and that part of the first concession of the Township of Brantford lying west of a continuation of the last mentioned line.

3.—The remainder of the Township of South Dumfries and of the first concession of the Township of Brantford.

4.—The ten northern concessions of the Township of Burford, and that part of the 2nd, 3rd, 4th and 5th concessions of the Township of Brantford, west of the line between lots numbers 10 and 11, and that portion of the Kerr Tract west of a continuation of the last mentioned line.

5.—The Township of Oakland, the four southern concessions of the Township of Burford, and lots numbers 1 to 5, inclusive, in the ranges east and west of the Mount Pleasant Road, in the Township of Brantford, adjoining the Township of Oakland.

6.—The Townships of Onondaga and Tuscarora, and that part of the Township of Brantford lying south of the main road from Brantford to Hamilton, and east of Fairchild's Creek.

COUNTY OF BRUCE.

1.—The Town of Walkerton, and the Township of Carrick, and all the Township of Brant south of the line between the 11th and 12th concessions.

2.—The Village of Teeswater, all the Township of Curloss, and that part of the Township of Greenock lying south of the line between the 11th and 12th concessions and Village of Lucknow, and all of Kinloss Township not in number nine.

3.—The Town of Kincardine, and that part of the Township of Kincardine lying south of a line drawn between the 9th and 10th concessions.

4.—The Village of Paisley and that part of the Township of Brant lying north of a line drawn between the 11th and 12th concessions of the Township of Brant.

All the Township of Elderslie, except lots 16 to 36, both inclusive, in concessions 12, 13 and 14 of said Township.

All the Township of Greenock lying north of a line drawn between concessions 11 and 12 of said Township.

Lots 26 to 35, both inclusive, in the 8th, 9th, 10th, 11th, 12th, 13th and 14th concessions of the Township of Bruce; and that part of the Township of Saugeen lying east of a line between lots 28 and 29, and south of the production of the town line between the Townships of Arran and Elderslie to the Saugeen River.

5.—All Saugeen Township not included in No. 4, all that part of the Township of Arran lying west of a line between lots 10 and 11 and north of Arran Lake and the outlet of said lake, and that part of the Township of Amabel lying south of the 10th concession of Amabel, and the Villages of Port Elgin and Southampton.

6.—The Village of Tiverton, and that portion of Kincardine Township north of a line drawn between concessions 9 and 10 in said Township, and all the Township of Bruce, except that part included in No. 4.

7.—That part of the Township of Elderslie not included in No. 4, and that part of Arran Township not included in No. 5, and the Village of Tara.

8.—The Village of Wiarton, the Township of Albermarle, and that part of the Township of Amabel lying north of a line between the 9th and 10th concessions.

9.—All the Township of Huron, and that part of the Township of Kinloss, described as follows:—

Commencing at the boundary line between said Townships of Huron and Kinloss, at a point at which the blind line between the 12th concession of said Township of Kinloss

and the third range south of the Durham Road, in the said Township of Kinloss, commences; thence in an easterly direction along said blind line to the westerly side of the Goderich Gravel Road, or the 10th side line of said Township of Kinloss; thence along said 10th side line in a southerly direction to the boundary line of the County of Huron; thence in a westerly direction along said last mentioned boundary to the said line between Huron and Kinloss aforesaid; thence northerly along said last named boundary line to the place of beginning.

10.—All the Townships of Eastnor, Lindsay and St. Edmunds.

COUNTY OF CARLETON.

1.—Comprising all the City of Ottawa, and the Township of Gloucester, to lot 15 inclusive, Rideau front and concessions 1 to 6, inclusive, Ottawa front and the Islands in the Ottawa River opposite thereto.

2.—All the Township of Goulbourn; the 8th, 9th and 10th concessions of the Township of Marlborough; all that portion of the Township of Nepean, south of the River Goodwood; and the 4th, 5th and 6th concessions thereof, north of the same river to the boundary line between lots 20 and 21 in the last mentioned concessions.

3.—All the Township of Huntley, and all the Township of March, except lots 1 to 5, inclusive, in concessions 1, 2, 3 and 4 thereof.

4.—All the Townships of Fitzroy and Torbolton.

5.—All the Township of North Gower; Long Island in the Rideau River and the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th concessions of the Township of Marlborough.

6.—All the Township of Osgoode; the 6th, 7th and 8th concessions Ottawa front, and from lots 16 to 30, inclusive, of the Rideau front of the Township of Gloucester.

7.—All the Township of Nepean, except the City of Ottawa and the part of the said Township lying south of the River Goodwood, and concessions 4, 5 and 6, north of said River Goodwood to the boundary line between lots 20 and 21 in said last mentioned concessions, and including also lots 1 to 5, inclusive, in concessions 1, 2, 3 and 4, in the Township of March.

COUNTY OF DUFFERIN.

1.—The Town of Orangeville, the Township of East Garafraxa, and all that portion of the Township of Amaranth lying south of the southerly boundary of lot number 26, in each concession of the Township of Amaranth.

2.—The Village of Shelburne, the Township of Melancthon and all that portion of the Township of Amaranth lying north of the southerly boundary of lot number 26, in each concession of the Township of Amaranth.

3.—The Township of Mulmur.

4.—The Township of Mono.

5.—The Township of East Luther.

COUNTY OF ELGIN.

1.—The Townships of Bayham, Malahide and South Dorchester.

2.—The Townships of Southwold and Yarmouth (except the City of St. Thomas).

3.—The City of St. Thomas.

4.—The Townships of Aldborough and Dunwich.

COUNTY OF ESSEX.

1.—Town of Sandwich and Township of Sandwich West.

2.—Town of Amherstburg and Townships of Malden and Anderdon.

3.—The Village of Kingsville, and all that part of the Township of Gosfield not included in Division No. 8.

4.—The Township of Colchester South, and all that part of Colchester North, south of the 9th concession, exclusive of the said concession and the lots on both sides of Malden, Street.

5.—Township of Mersea and Village of Leamington.

6.—Bell River, and the Township of Tilbury West and Rochester.

7.—Town of Windsor and Townships of Sandwich East, Maidstone, north of the Middle Road.

8.—All that part of the Township of Maidstone lying south of the Middle Road; so much of Sandwich East as is south of Talbot Street, including the lots on both sides of said street to Nos. 306 and 307; all of Colchester north of the 9th concession, including said concession and lots on both sides of Malden Street and all that part of Gosfield lying north of concession 6, and extending as far east from the limits between Gosfield and Colchester as lot No. 12, including such lot in each concession north of concession 6, inclusive.

COUNTY OF FRONTENAC.

1.—City of Kingston, Townships of Garden Island, Wolf Island, Howe Island and part of the Township of Pittsburg.

2.—Cataraqui, comprising the Township of Kingston and the Village of Portsmouth.

3.—Loughboro', comprising the Townships of Loughboro' and Bedford.

4.—Verona, comprising the Townships of Portland and Hinchinbrooke.

5.—Sunbury, comprising the Townships of Storrington and part of the Township of Pittsburg.

6.—Comprising the Townships of Kennebec, Olden, Oso, Barrie, Claredon, Palmerston, Miller, North Canonto and South Canonto.

COUNTY OF GREY.

1.—The Town of Owen Sound; the Village of Brooke; and the Townships of Derby Keppel, Sarawak and Sydenham.

2.—The Town of Durham, the Township of Egremont, and those portions of the Townships of Bentinck, Normanby and Glenelg, as follows:—That part of the Township of Bentinck lying east of the line between lots 30 and 31 in the 1st, 2nd and 3rd concessions south of the Durham Road, and in concessions 1, 2 and 3 north of the Durham Road, and east of the line between lots 15 and 16 in concessions 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 thereof. That part of the Township of Normamby lying east of the line between lots 20 and 21, in the 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th and 18th concessions, and all of the Township of Glenelg, excepting that portion lying east of the line between lots 10 and 11 in the 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th and 15th concessions thereof.

3.—The Town of Meaford, the Township of St. Vincent and that part of the Township of Euphrasia, lying west of the line between the 6th and 7th concessions, and north of the line between lots 15 and 16.

4.—The Township of Collingwood, and the East half of the Township of Euphrasia, excepting that part thereof lying west of the line between the 4th and 5th concessions, and south of the lots between lots 12 and 13.

5. The Township of Proton, the west half of the Township of Osprey, and those parts of the Township of Artemesia, consisting of the ranges of lots lying parallel to the Toronto and Sydenham Road, and south of the line between lots 130 and 131, and concessions 1, 2 and 3, south of the Durham Road, and 1, 2, 3, 4, 5 and 6, north of the said Durham Road, and those portions of concessions 7, 8 and 9 lying east of the ranges of lots parallel with the Toronto and Sydenham Road, and those portions of concessions 10, 11, 12, 13 and 14 lying east of the line between lots 30 and 31.

6.—The Township of Sullivan and the Township of Holland, excepting those portions of concessions 9, 10, 11 and 12, lying south of the line between lots 15 and 16, and those portions of concessions 7 and 8 west of the ranges of lots lying parallel with the Toronto and Sydenham Road, and the ranges of lots lying parallel with the Toronto and Sydenham Road, and south of the line between lots 50 and 51.

7.—All the lots from 1 to 30, inclusive, in the three concessions south, and the three concessions north of the Durham Road, in the said Township of Bentinck; and all the lots from 1 to 15, inclusive, in the 12 concessions, from the 4th to the 15th concessions, inclusive, of the said Township of Bentinck; and all the lots from 1 to 20, inclusive, in all the concessions from 4 to 18, inclusive, in the Township of Normanby aforesaid.

8.—All the lots from 51 to 130, inclusive, in all the concessions parallel to (and being north-east and south-west), of the Toronto and Sydenham Road, in the Townships of Artemesia, Glenelg and Holland aforesaid; all lots to the westward of the dividing line between lots 30 and 31, in all the concessions from 10 to 14 inclusive, and all the lots from 1 to 5 in the 7th, 8th and 9th concessions, inclusive, which lie to the south-west of the 3rd concession, south-west of the said Toronto and Sydenham Road, in the said Township of Artemesia; all the lots from 1 to 12, inclusive, in concessions 5 and 6, and the lots from 1 to 15, inclusive, in the concessions from 7 to 12, inclusive, in the Township of

Euphrasia; all lots south of the allowance for road between lots 15 and 16 in the 9th, 10th, 11th and 12th concessions, and from lot 25 to lot 30, inclusive, in the 7th conncession, and lots 28, 29 and 30 in the 8th concession of the said Township of Holland; and all the lots lying east of the allowance for road between lots 10 and 11, in all the concessions from 7 to 15, inclusive, in the said Township of Glenelg.

COUNTY OF HALDIMAND.

1.—All the Township of Seneca, except the first and second concessions, the Young Tract, and the property of the late Richard Martin and the late Robert Wier; all the Township of Oneida, except the first range north of the Cayuga line; the Dennis Tract and the lots southerly of said tract.

2.—The whole of the Township of North Cayuga, except that portion thereof lying north-east of side line between lots 12 and 13; the first and second concessions of the Township of Seneca, excepting that portion thereof lying north-east of the side line between lots 12 and 13; the Young Tract. and the lands of the late Robert Weir and the late Richard Martin, Esquires; the first range of Oneida and north of Cayuga line; also the Dennis Tract and river lots lying south.

3.—The Townships of Moulton, Sherbrooke and Dunn, including the Village of Dunnville.

4.—The Townships of South Cayuga and Rainham.

5.—The Township of Camboro, and those portions of North Cayuga and Seneca not included in the other divisions.

6.—The Township of Walpole.

COUNTY OF HALIBURTON.

1.—The Townships of Glamorgan, Snowden, Lutterworth, Minden, Anson, Stanhope, Hindon, Sherbourne and McClintock.

2.—The Townships of Dysart, Guilford, Havelock, Livingstone, Lawrence, Eyre, Harburn, Dudley, Monmouth, Cardiff, Harcourt, Bruton, Clyde and Nightingale.

COUNTY OF HALTON.

1.—All that portion of the Township of Trafalgar from the line between the 5th and 6th concessions of the New Survey west to the township line, and from the line between lots 18 and 19 in the Old Survey, also westerly to the town line.

2.—The remaining part of the Township of Trafalgar east of the limits of Division No. 1.

3.—The five easterly concessions of the Township of Esquesing.

4.—The six westerly concessions of the Township of Esquesing.

5.—The Township of Nassagaweya.

6.—The Township of Nelson.

COUNTY OF HASTINGS.

1.—To comprise the city of Belleville.

2.—To comprise all that part of the Township of Sidney which lies east of the line between lots Nos. 6 and 7 in the several concessions, and south of the 9th concession.

3.—The Township of Tyendenaga, except that part called Deseronto.

4.—The Township of Hungerford.

5.—All that part of the Township of Sidney which lies to the north of the 8th concession, and to the east of lot No. 6 in each concession north of the 8th concession, and all that part of the Township of Rawdon which lies to the south of the 9th concession, and that part of the Township of Huntingdon south of the 6th concession.

6.—The Townships of Madoc, Tudor, Limerick, excepting that part lying north of the 10th concession, and also that part lying west of lots 25 in the different concessions, south of the 11th concession of said Township, and including all that part of the Township of Huntingdon north of the 5th concession of said Township.

7.—The Village of Deseronto.

8.—The Township of Thurlow.

9.—The Town of Trenton, and all that part of the Township of Sidney which lies to the west of lot No. 7 in each of the concessions of the said Township, including Mill Island.

10.—The Townships of Marmora, Lake, and all that part of the Township of Rawdon which lies to the north of the 8th concession.

11.—The Townships of Elzevir, Grimsthorpe, Cashel, excepting that part of Cashel ying north of the 10th concession of said Township.

12.—The Township of Wollaston, Faraday, Herschel, McClure, Wicklow, Bangor, Carlow, Monteagle, Dungannon, Mayo, and all that part of the Township of Cashel lying north of the 10th concession of said Township, and all those parts of the Township of Limerick lying north of the 10th concession, and west of lot No. 25 in the several concessions in said Township of Limerick.

COUNTY OF HURON.

1.—Comprising that part of the Township of Goderich to the north of the Cut Line and the Huron Road until the same meets the road allowance between the 13th and 14th concessions: then back along the Huron Road to its junction with the Cut Line; then west by the road allowance between concessions 11 and 12 to the River Maitland; then along the River Maitland to Goderich, together with the Township of Colborne.

2.—Comprising the Township of McKillop, the Town of Seaforth, and all that portion of the Township of Tuckersmith not included in the Third Division.

3.—Comprising the Township of Hullett; that part of the Township of Goderich not included in Numbers 1 and 7; 1st, 2nd, 3rd and 4th concessions Township of Stanley;

1st and 2nd concessions Township of Tuckersmith, L. R. S., north of lot 15, and that portion west of side-road between lots 25 and 26, H. R. S.; and Town of Clinton.

4.—Comprising the Township of Grey; all of the Township of Morris, east of side-road between lots numbers 10 and 11; and the Village of Brussels.

5.—Comprising the Townships of Usborne and Stephen, the first four concessions of the Township of Hay, and the Village of Exeter.

6.—Comprising the Townships of West Wawanosh and Ashfield.

7.—Comprising the Township of Goderich south of Cut Line and Huron Road until the same joins the road between the 13th and 14th concessions of the Township of Goderich; thence along the said concession until the same joins the river Bayfield; all Stanley not included in number 3; all Hay not included in number 5, and the Village of Bayfield.

8.—Comprising the Village of Wingham, the Townships of Turnberry and East Wawanosh, all the Township of Morris not included in number 4, and the Village of Blyth.

9.—Comprising the Township of Howick and the Village of Wroxeter.

10.—Comprising the Township of Hay.

11.—Comprising the Township of Stephen.

COUNTY OF KENT.

1.—The First Division Court to consist of the Town of Chatham and that part of the Townships of Dover East and West to the south of the 12th and 13th concession line of the Township of Dover East; and that part of the Township of Chatham south of the 12th and 13th concession line, and west of the side road between lots 12 and 13, from the first mentioned 12th and 13th concession line to the 5th and 6th concession line, and all south of the said 5th and 6th concession line of said Township; that part of the Township of Harwich north of 5th and 6th concession line by the eastern boundary; that part of the Township of Raleigh north of the 16th concession to the west side road between lots 12 and 13 north to the 6th and 7th concession line, and all of the said Township north of the said last mentioned line, and that part of the Township of Tilbury East north of the 4th concession.

2.—The Second Division to consist of that part of the Township of Howard south of the 2nd and 3rd concession line by the eastern boundary (known as the Botany Road), and that part of the Township of Orford south of the 10th and 11th concession line of said Township.

3.—The Third Division to consist of all that part of the Gore of Camden lying west of the 10th and 11th concession line, and that part of the Township of Camden lying west of the side line, between lots 6 and 7; the Village of Dresden, and that part of the Township of Chatham, north of the 5th and 6th concession line, and east of the side-road between lots 12 and 13.

4.—The Fourth Division to consist of that part of the Township of Harwich south of the 5th concession of the eastern boundary, and south of the 3rd concession by the

western boundary, and that part of Raleigh south of the 15th concession and east of the side road between lots 12 and 13, and the road to the lake shore through lot 146 on the Talbot road.

5.—The Fifth Division to consist of the Village of Wallaceburg, the Gore of Chatham, and that part of the Township of Chatham, north-west of the 12th and 13th concession line and west of the side road between lots 12 and 13, and that part of Dover East lying north of the 12th and 13th concession side-road.

6.—The Sixth Division to consist of that part of the Township of Howard, north of the Botany Road aforesaid, and of that part of the Township of Orford north of the 10th and 11th concession line, the Township of Zone, the Town of Bothwell, the Village of Thamesville, and that part of the Gore of Camden east of the 10th and 11th concession line, and that part of the Township of Camden east of the side line between lots 6 and 7.

7.—The Seventh Division to consist of that part of Tilbury East south of the 3rd concession, the Township of Romney, and that part of the Township of Raleigh, south of the 6th and 7th concession line and west of the side road between lots 12 and 13 in the said Township, and the road through lot 147 on Talbot road.

COUNTY OF LAMBTON.

1.—The external boundaries of the Township of Sarnia.

2—The external boundaries of the Township of Warwick

3.—The external boundaries of the Townships of Euphemia and Dawn.

4.—The external boundaries of the Township of Sombra.

5.—The external boundaries of the Township of Plympton.

6.—The external boundaries of the Township of Bosanquet.

7.—The external boundaries of the Township of Moore.

8.—The external boundaries of the Township of Enniskillen.

9.—The external boundaries of the Township of Brook.

COUNTY OF LANARK.

1. The Townships of Drummond, Bathurst, South Sherbrooke, Burgess North, and that part of the Township of Elmsley North, north of the Rideau River, within the County of Lanark and west of lot No. 12, in each concession.

2.—The Townships of Lanark, Dalhousie, Darling, Lavant and North Sherbrooke.

3.—The Township of Beckwith, and the first six lots in the first seven concessions of the Township of Ramsay.

4.—The Township of Montague, and that part of the Township of North Elmsley from lot No. 1 to lot No. 12 in each concession, both inclusive.

5.—The Township of Pakenham.

6.—The Township of Ramsay, with the exception of the first six lots on the first seven concessions of the said township.

UNITED COUNTIES OF LEEDS AND GRENVILLE.

1.—To consist of the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th concessions and broken front of the Township of Elizabethtown, and the concession roads between them.

2.—To consist of the 1st, 2nd, 3rd, 4th and 5th concessions, and broken front, and that part of the 6th, 7th and 8th concessions from the town line of Edwardsburgh, to lot number 18; inclusive of the Township of Augusta, and the concession roads between them.

3.—To consist of the 1st, 2nd, 3rd, 4th and 5th concessions and broken front of the Townships of Leeds and Lansdowne, respectively, and the concession roads between them.

4.—To consist of the Township of South Gower, the Township of Oxford, from the west side line of lot numbers 11 in all the concessions of the eastern boundary of the township, and the gore of land between South Gower, Oxford and Edwardsburgh.

5.—To consist of the Township of Wolford (except the 7th and 8th concessions and the allowance of road between them), lots numbers 1 to 10, inclusive, in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th concessions of the Township of Oxford, and the allowance of roads within and between them.

6.—To consist of the Townships of Bastard and Burgess, and those parts of the Townships of Leeds and Lansdowne, on the north side of the rear of the 5th concession in each, respectively.

7.—To consist of the Townships of Kitley and Elmsley.

8.—To consist of the Townships of North Crosby and South Crosby.

9.—To consist of that part of the Townships of Escott and Yonge, in rear of the 4th concession of Yonge, and in the rear of the 6th concession of Escott; that part of the Township of Elizabethtown, in rear of the 7th concession, and west of lot number 18 in the 8th, 9th, 10th and 11th concessions, and the allowances for roads embraced therein.

10.—To consist of the Township of Edwardsburg.

11.—To consist of that part of the Township of Augusta, in rear of 5th concession, and west of lots numbers 18, in the 6th, 7th and 8th concessions; the whole of the 9th and 10th concessions of the Township of Augusta; the Gore between the Townships of Oxford, Wolford and Augusta; that part of the Township of Elizabethtown in rear of the 7th concession, and east of the commons, between lots numbers 18 and 19 in the 8th, 9th and 10th concessions; the 7th and 8th concessions of the Township of Wolford; lots numbers 1 to 10, inclusive, in the 9th and 10th concessions of the Township of Oxford; and the allowances for roads embraced therein.

12.—To consist of the 1st, 2nd, 3rd and 4th concessions and broken front of the Township of Yonge; the 1st, 2nd, 3rd, 4th, 5th and 6th concessions and broken front of the Township of Escott, and the allowances for roads embraced therein.

The said 1st, 2nd, 3rd and 12th divisions shall. respectively, embrace and comprehend within their limits those portions of the River St. Lawrence, and Islands therein, within the exterior side lines of which such portions of said river and islands would lie and be, if such exterior side lines were produced and extended in that directon to the utmost limits of the Province.

COUNTY OF LENNOX AND ADDINGTON.

1.—The Town of Napanee; Township of Richmond; all that part of North Fredericksburg and Adolphustown lying north of Hay Bay; and all that part of North Fredericksburg lying north of Big Creek.

2.—Comprises 1st concession of Ernesttown, the Village of Bath, the Township of Amherst Island, and the 2nd, 3rd, and 4th concessions of the said Township of Ernesttown, from the west limits thereof to the west limit of lot No. 21, in each concession.

3,—Township of South Fredericksburg and all that part of North Fredericksburg and Adolphustown, not included in Division No. 1.

4.—1st, 2nd and 3rd concessions of the Township of Camden and the Villege of Newburgh.

5.—All that part of the Township of Camden, not included in Division No. 4.

6.—All that part of the Township of Ernesttown. not included in the limits of Division No. 2.

7.—Townships of Shetfield, Kalador, Anglesea, Abinger, Effingham and Denbigh.

COUNTY OF LINCOLN.

1.—The Town and Township of Niagara.

2.—The Township of Grantham (including the City of St. Catharines, the Villages of Merritton and Port Dalhousie), and the Township of Louth.

3.—The Townships of Caistor and Gainsborough, and the 9th concession of the Township of Grimsby, including the 1st and 2nd ranges as part of the said concession.

4.—The Villages of Grimsby and Beamsville; the Township of Clinton and the Township of Grimsby, except the 9th concession and the 1st and 2nd included as part of the said 9th concession.

COUNTY OF MIDDLESEX.

1.—That part of the City of London lying to the west of Maitland street, with that portion of the Township of London lying south of the line between the 4th and 5th concessions and west of the said street, produced northerly or a line in the same direction to the line between the said 4th and 5th concessions, and with that portion of the Township of Westminster lying west of the main road leading south from Clarke's Bridge,

across the Thames; south to the line between the 1st and 2nd concessions; and westerly to the line between lots 42 and 43, and extending northerly to the River Thames; and also including the Village of London West.

2.—The Villages of Parkhill and Ailsa Craig, the Townships of East Williams and West Williams, and that portion of the Township of Lobo, lying north of the line between the 11th and 12th concessions; and east of the line between lots numbers 12 and 13.

3.—The Townships of McGillivray and Biddulph, and the Village of Lucan.

4.—The Township of Delaware, with that portion of the Township of Westminster west of the line between lots 30 and 31, in the 2nd concession; then southerly on the line between lots 20 and 21, to the southerly limit of the Township, including all west of said line; and also including all that portion of the front of said Township of Westminster, lying west of the line between lots numbers 42 and 43, not included in the first division; with that portion of the Township of Caradoc lying south of the line, between the 5th and 6th concessions, to the River Thames; and with that portion of the Township of Lobo, lying south of the line, between the 6th and 7th concessions, to the River Thames.

5.—The Townships of Ekfrid and Mosa, including the Villages of Wardsville, Newbury and Glencoe.

6.—The Townships of Adelaide and Metcalf; the Town of Strathroy, with that portion of the Township of Caradoc lying north of the line, between the 3rd and 4th concessions; with that portion of the Township of Lobo which lies north of the 6th concession, and west of the line between lots 12 and 13 of the said Township.

7.—The Township of North Dorchester, north and south of the River Thames; that portion of the Township of West Nissouri which lies south of the line between lots 14 and 15; and with that portion of the Township of Westminster lying south of the line between the 1st and 2nd concessions, and east of the line between lots 30 and 31 in the second concession, and thence east of the line between lots 20 and 21, continued south to the southerly limit of the said Township of Westminster.

8.—All that portion of the Township of London which lies north of the line between the 4th and 5th concessions; that portion of the Township of Lobo which lies north of the line between the 6th and 7th concessions, and east of the line between lots 12 and 13, to the line between the 11th and 12th concessions, and with all that portion of the Township of West Nissouri which lies north of the line between lots number 14 and 15.

9.—That part of the City of London lying east of Maitland street; that part of the Township of London lying south of the line between the 4th and 5th concessions, and east of the said street, produced northerly or in a line in the same direction to the line between the said 4th and 5th concessions; and that part of the Township of Westminster lying north of the line between the 1st and 2nd concessions, and east of the main road leading south from Clark's Bridge, across the Thames.

DISTRICT OF MUSKOKA.

1.—The Village of Bracebridge, and the Townships of Macaulay, McLean, Ridout, Monck and Cardwell, concessions 1, 2, 3, 4, 5, 6, 7, 8 and 9 in the Townships of Stephenson, Bruce and Franklin, and that part of the Township of Watt, situated east of lot 21, in the several concessions thereof; and concessions 7, 8, 9, 10, 11, 12 and 13 in the Townships of Muskoka and Draper.

2.—The Village of Gravenhurst ; the Townships of Morrison, Ryder and Oakley, and concessions 1, 2, 3, 4, 5 and 6 of the Townships of Muskoka and Draper.

3.—The Village of Huntsville ; the Townships of Stisted, Chaffey and Sinclair ; and concessions 10, 11, 12, 13, and 14 in the Townships of Stephenson, Brunel and Franklin.

4.—The Townships of Wood, Medora and Humphrey, and that part of the Township of Watt situated west of lot 21 in the several concessions thereof.

DISTRICT OF NIPISSING.

1.—To be composed of the Townships of Springer, Field, Badgerow, Caldwell, Kirkpatrick, Hugel, Rattler, Dunnet, Hagar and Appleby, and all that part of the District of Nipissing which is situated west of the line between the Indian Reserve and the Township of Widdifield, produced, north and south, to the boundary of the said district and east of the eastern boundary of the fourth division.

2.—To be composed of the Townships of Mattawan, Olrig, Calvin, Papineau, Lauder, Pentland, Boyd, Osler, McLaughlin, Canisbay, Sabine, Lyell, Airy, Murchison and Robinson, and all that part of the District of Nipissing situated east of the line between the Townships of Bonfield and Calvin, produced, south to the provisional County of Haliburton, and east of the line between the Townships of Phelps and Olrig, produced, north to the Ottawa River.

3.—To be composed of the Townships of Widdifield, Merrick, Mulock, Phelps, Ferris, Bonfield, Boulter, Chisholm, Ballantyne, Wilkes, Biggar, Paxton, Butt, Devine, Hunter, McCraney, Finlayson, Peck, and all that part of the District of Nipissing situated west of the line between the Townships of Phelps and Olrig, produced, north to the Ottawa River and east of the eastern boundary of first division.

4.—To be composed of the Townships of McKim, Neelon, Dryden, Awrey, Hawley, Blezard, and all that part of the District of Nipissing which is situated west of the line between the said Township of Awrey and the Township of Hagar, produced, north and south to the boundary of the said district.

COUNTY OF NORFOLK.

1.—The Gore of the Township of Woodhouse, and all that part of said Township lying west of the side line between lots 5 and 6, together with that part of the 4th, 5th and 6th concessions lying west of the side line, between lots 12 and 13, including that part of the Town of Simcoe within the same.

2.—The Township of Townsend.

3.—The Township of Windham.

4.—The Township of Middleton.

5.—The Township of Charlotteville.

6.—The Township of Walsingham.

7.—The Township of Houghton.

8.—All that part of the Township of Woodhouse not included in Division No. 1, viz.: all that part of the 1st, 2nd and 3rd concessions lying east of the side line, between lots 5 and 6, and that part of the 4th, 5th and 6th concessions lying east of the said line, between lots Nos. 12 and 13 in said Township.

UNITED COUNTIES OF NORTHUMBERLAND AND DURHAM.

1.—Townships of Cartwright and Darlington, and Town of Bomanville.

2.—Township of Clarke and Village of Newcastle.

3.—Township of Hope and Town of Port Hope.

4.—Townships of Cavan, Manvers, South Monaghan and Village of Millbrook.

5.—Township of Hamilton and Town of Cobourg.

6.—Townships of Haldimand and Alnwick.

7.—Township of Cramahe and Village of Colborne.

8.—Township of Brighton and Village of Brighton.

9.—Township of Percy and Village of Hastings.

10.—Township of Murray.

11.—Township of Seymour and Village of Campbellford.

COUNTY OF ONTARIO.

1.—Including the Townships of Whitby and East Whitby and the Towns of Whitby and Oshawa.

2.—The Township of Pickering.

3.—The Townships of Reach and Scugog, and the Village of Port Perry.

4.—The Townships of Uxbridge and Scott, and the Town of Uxbridge.

5.—The Township of Brock and the Village of Cannington.

6.—The Township of Thorah, and all that part of the Township of Mara, lying south of the line, between the 4th and 5th concessions.

7.—All that part of the Township of Mara, lying north of the line, between the 4th and 5th concessions thereof, and the Township of Rama.

COUNTY OF OXFORD.

1.—Comprises the Town of Woodstock, the Townships of Blanford, East Zorra, East Oxford, and that part of the Township of North Oxford, situated east of lot 16, and that part of West Oxford, lying east of lot No. 7, to the Stage Road, thence on the north side of the Stage Road, to where the said road intersects the Township of East Oxford.

2.—Comprises the Township of Blenheim.

3.—Comprises the Township of West Zorra and East Nissouri.

4.—Comprises the Townships of North Norwich and South Norwich and the Village of Norwich.

5.—Comprises all those portions of the Townships of North Oxford and West Oxford, not comprised in the 1st Division; the Town of Ingersoll, and those portions of the 1st and 2nd concessions of the Township of Durham, west of the Middle Town line.

6.—Comprises the Town of Tilsonburg, and all that portion of the Township of Durham, not included in the 5th Division.

DISTRICT OF PARRY SOUND.

1.—The Village of Parry Sound, and the Townships of Foley, McDougall, Cowper and Carling, and all that portion of the District lying to the west of the east boundary of Carling, produced to the French River.

2.—The Townships of McKellar, Croft, Hagarman, Ferguson, and all that portion of the district lying between the east boundary of Ferrie, and the west boundary of Ferguson, produced to the French River.

3.—Townships of Humphrey, Christie, Monteith and Conger.

4.—Townships of McMurrich, Perry and Armour.

5.—The Townships of Spence, Chapman, Lount, Proudfoot, Bethune and Sinclair.

6.—That Territory bounded on the west by the western boundaries of Townships of Pringle and Patterson, and the westerly boundary of the Township of Patterson, produce to French River and Lake Nipissing; on the east by the eastern boundary of the District of Parry Sound, and on the south by the southern boundaries of the Townships of Himsworth, Gurd and Pringle.

7.—The Townships of Machar, Laurier, Strong and Joly.

COUNTY OF PEEL.

1.—Town of Brampton, Township of Chinguacousy and northern division of Township of Toronto Gore.

2.—Village of Streetsville, Township of Toronto, and southern division of Township of Toronto Gore.

3 —Township of Caledon.

4.—Village of Bolton, Township of Albion.

COUNTY OF PERTH.

1.—To consist of all that part of the Township of North Easthope, west of the line between lots 25 and 26, and south of the road between the 8th and 9th concessions, and all that part of the Township of South Easthope, west of the side line, between lots 25 and 26; all that part of the Township of Downie and Gore, north and east of the concession line, between the 10th and 11th concessions and the Oxford road; and all the Township of Ellice, from the 1st to the 13th concessions inclusive.

2.—To consist of all that part of the Township of Fullarton, not included in Division No. 3, and the Townships of Hibbert and Logan.

3.—To consist of that portion of the Township of Downie, west of the Oxford road and south of the concession line between the 10th and 11th concessions; the Township of Blanchard; all that part of the Township of Fullarton, comprising the 13th and 14th concessions, and south of a road leading from the Mitchell road, between lots 24 and 25, east to lot 3 in the 10th concession; thence east along the line between the 10th and 11th concessions to the town line.

4.—To consist of that part of the Township of North Easthope, east of the line between lots 25 and 26, and north of the 8th concession, inclusive, with the 9th and 10th concessions; all that part of the Township of South Easthope, not included in Division No. 1.

5.—To consist of the Township of Mornington, and all that part of the Township of Elma, from lots No. 53 to 72, both numbers inclusive, of the first concession, and from lots No. 27 to No. 36, both numbers inclusive, in and from the second to the eighteenth concessions, both concessions inclusive, of said Township of Elma; and concessions 14, 15 and 16 of the Township of Ellice, and concessions 11th, 12th, 13th and 14th of the Township of North Easthope.

6.—To consist of the Township of Wallace, and all that part of the Township of Elma, from the 1st concession to the 18th concession, both concessions inclusive, and comprising lots Nos. 1 to 52, both inclusive, of the 1st concession, and lots No. 1 to No. 26 inclusive, from the 2nd to the 18th concessions, both concessions inclusive.

COUNTY OF PETERBOROUGH.

1.—Composed of the Town of Peterborough, the Village of Ashburnham, the Townships of North Monaghan and Ennismore, and all that part of the Township of Harvey, lying west of Pigeon Lake and south of Bobcaygeon: and all the Township of Smith, lying south of the 7th concession; and all the Township of Otonabee, lying west of the 8th concession, and north of lots 21 from the said 8th concession to the western boundary of said Township of Otonabee; and all the Township of Douro, lying south of lots numbered 11; and that part of the Township of Dummer, lying south of lots numbered 11, and west of the 5th concession.

2.—Composed of the Townships of Asphodel, Belmont and Methuen, and that part of the Township of Dummer, lying east of the 4th concession and south of lots numbered 11.

3.—Composed of all that part of the Township of Otonabee lying east of the 9th concession; and all that part of said Township of Otonabee, lying south of lots numbered 22, and west of the 8th concession.

4.—Composed of all that part of the Township of Smith, lying north of the 6th concession; and all that part of the Township of Douro, lying north of lots numbered 10; and all that part of the Township of Dummer, lying north of lots numbered 10; and also of the Village of Lakefield, and of the Township of Galway; and all the Township of Harvey, except that portion lying west of Pigeon Lake, and south of Bobcaygeon.

5.—Composed of the Townships of Burleigh, Cavendish, Anstruther and Chandos.

UNITED COUNTIES OF PRESCOTT AND RUSSELL.

1.—Comprises the whole of the Township of Longueuil, the municipality of the Village of L'Orignal, and the first concession of the Township of Caledonia.

2.—Comprises all that part of the Township of West Hawkesbury, extending from the front of the third concession, to the rear of the said township.

3.—Comprises the whole of the Township of East Hawkesbury.

4.—Comprises the Township of North Plantagenet, and that part of the Township of South Plantagenet, lying North of the Nation River.

5.—Comprises the whole of the Township of Cumberland.

6.—Comprises the whole of the Township of Russell.

7.—Comprises the two front concessions of the Township of West Hawkesbury, and the municipality of Hawkesbury Village, within the same.

8.—Comprises the Township of Caledonia (excepting the 1st concession of the said township), and also that portion of the Township of South Plantagenet, lying south and east of the Nation River.

9.—Comprises the whole of the Township of Alfred.

10.—Comprises the whole of the Township of Clarence.

11.—Comprises the whole of the Township of Cambridge.

COUNTY OF PRINCE EDWARD.

1.—The Town of Picton, the 2nd and 3rd concessions "Military Tract," from the west line of lot No. 13, eastward; Gore "G"; 1st and 2nd concession north of the Carrying Place; 1st concession south-east of the Carrying Place, and 2nd concession north of Black River, including Gore "K" and "L" and McCan Gores, all in the Township of Hallowell; Block "I" the concessions north and east of East Lake and Gore "B," in the Township of Athol, and the 1st and 2nd concessions south of the Bay of Quinte, and Gore "A." in the Township of North Marysburgh, and 1st concession south-west of Green Point, to the end of Carman's Point in Sophiasburg.

2.—The Township of South Marysburgh, and the southern part of Athol, commencing at the outlet of East Lake, thence down to the head of the lake, thence down to the base line between the 1st concession south and the 1st concession north of East Lake, till it strikes the Township line of Hallowell, thence down said Township line till it strikes South Marysburgh.

3.—The Township of Sophiasburg, together with Big Island, excepting the 1st concession south-west of Green Point to the end of Carman's Point.

4.—All that part of the Township of Ameliasburgh lying east of the line between lots Nos. 86 and 87, in the 1st, 2nd, 3rd and 4th concessions of said Township, including Huff's Island.

5.—That part of the Township of Hillier, not included in the 7th Division, also the 1st and 2nd concessions north of West Lake, and west of lot No. 7 in the said concession, and that part of Irwin Gore lying north of and west of lot No. 7 in the 2nd concession, and the west part of the 2nd concession produced west of lots No. 74, in that concession in the Township of Hallowell.

6.—Block (IV.) four, concession south side of West Lake, 1st concession "Military Tract," 2nd and 3rd concessions of said Tract west of lots No. 13 in those concessions, Gore "E," 1st and 2nd concessions north of West Lake and east of lot No. 6 in those concessions; the Gerrow Gore and that part of Irwin Gore not included in Division No. 5, and all that part of the 2nd concession produced east of lot No. 75 in the Township of Hallowell.

7.—All that part of the Township of Ameliasburgh lying west of the line between lots Nos. 86 and 87, in the 1st, 2nd, 3rd and 4th concessions of said Township; all that part of the 4th and 5th concessions of the Township of Hillier, west of the line between lots Nos. 86 and 87, and the 3rd concession west of the line between lots Nos. 22 and 23, with that part of the 2nd concession lying north of Pleasant Bay, in the said Township of Hillier.

8.—All the point lying east of the west line of Martsland's Gore, the concession north Smith's Bay and Waupoos Island in the Township of North Marysburgh.

DISTRICT OF RAINY RIVER.

1.—That part of the District composed of the territory to the north of the south-easterly shore of the Lake of the Woods, and a line drawn in a north-easterly direction from Rat Portage to the north end of Lake Manitou; thence in an easterly direction to the south end of the lake known as the lake where the river bends; thence in an easterly direction to a point where the said meridian of the most easterly part of Hunter's Island intersects the Canada Pacific Railway at the south-west angle of Hawk Lake.

2.—The territory lying south and east of the Lake of the Woods, and of the said line.

COUNTY OF RENFREW.

1.—Comprising the Town of Pembroke, the Townships of Pembroke, Stafford, Alice, Petewawa, Buchanan, Rolph, Wylie, McKay, Fraser, Head, Clara and Maria, and all that part of the Township of Wilberforce from the 18th to the 25th concessions, both inclusive; and also all those parts of the 14th, 15th, 16th and 17th concessions of same Township of Wilberforce lying north of Snake River and east of Lake Doré.

2.—Comprising all that part of the Township of Westmeath lying east and north of the Muskrat Lake and River, and all those parts of the Township of Ross, from the 5th to the 9th concessions, both inclusive, east of Muskrat Lake, and from the 7th to the 13th of the other) concessions of Ross, both inclusive, of the said Township of Ross.

3.—Comprising the Village of Renfrew, and the Townships of Horton and Admaston.

4.—Comprising the Village of Arnprior and the Township of McNab.

5.—Comprising the Townships of Bagot, Blythfield, Brougham and Metawatchan.

6.—Comprising the Townships of Grattan, Sebastopol, South Algona, North Algona, and all that part of the Township of Wilberforce from the 1st to the 17th concessions, both inclusive, excepting those parts of the 14th, 15th, 16th and 17th concessions of same Township of Wilberforce lying north of Snake River and east of Lake Doré.

7.—Comprising the Township of Bromley, and all that part of the Township of Westmeath west of Muskrat Lake, and all those parts of the Township of Ross, from the 1st to the 4th concessions, both inclusive, east of Muskrat Lake, and from the 1st to the 6th of the other concessions, both inclusive, of the said Township of Ross.

8.—Comprising the Townships of Brudenell, Radcliff, Raglan, Lyndoch, Griffith, Hagarty, Sherwood, Jones, Richards and Burns.

COUNTY OF SIMCOE.

1.—Comprising the Town of Barrie, the Township Vespra, except that portion lying west of the Nottawasaga River, and excepting also lots Nos. 38, 39 and 40 in the 1st and 2nd concessions, and lots Nos. 1, 2 and 3 in the 3rd, 4th, 5th, 6th and 7th concessions, respectively. That portion of the Township of Oro lying south of lots Nos. 21 in the 1st and 2nd concessions (including the Ranges), and south of lots Nos. 13 in the 3rd, 4th, 5th, 6th, 7th and 8th concessions, respectively; that portion of the Township of Innisfil lying east of lots Nos. 5 in the 6th, 7th and 8th concessions, and that portion lying north of the 8th concession; that portion of the Township of Essa lying north of lots Nos. 19 in the 7th, 8th, 9th, 10th and 11th concessions.

2.—The Village of Bradford; the Township of West Gwillimbury, excepting thereout lots Nos. 1, 2, 3, 4 and 5 in the 14th and 15th concessions; the township of Innisfil, except that portion lying north of the 5th concession, and excepting also lots Nos. 1, 2, 3, 4 and 5 in the 1st, 2nd, 3rd, 4th and 5th concessions.

3.—The Township of Tecumseth, except concessions 12, 13, 14 and 15; the Township of Adjala, except that portion lying north of lots Nos. 25 in the 8th concession thereof.

4.—The Town of Collingwood, the Village of Stayner, that portion of the Township of Nottawasaga lying north of lots Nos 18 in the twelve concessions thereof; that portion of the Township of Sunnidale lying north of the 8th concession; that portion of the Township of Flos lying west of the Nottawasaga river; the Islands in Lake Huron contiguous to the Township of Nottawasaga.

5.—The Township of Flos, except that portion lying west of the Nottawasaga river; the Township of Medonte, except that portion lying east of the 10th concession, and north of lots Nos. 10 in the 9th and 10th concessions, respectively; that portion of the Township of Oro, lying north of the southern boundaries of lots Nos. 21 in the 1st and 2nd concessions, and north of the southern boundaries of lots Nos. 13 in the 3rd, 4th, 5th, 6th, 7th and 8th concessions, respectively; lots Nos. 38, 39 and 40 in the 1st and 2nd concessions, and lots Nos. 1, 2 and 3 in the 3rd, 4th, 5th, 6th and 7th concessions of the Township of Vespra.

6.—The Town of Orillia, the Township of Orillia, southern division, the Township of Orillia, northern division, except that portion lying north of lots Nos. 15 in the first seven concessions thereof; that portion of the Township of Oro lying east of the 8th concession; that portion of the Township of Medonte being composed of lots Nos. 1 to 6 (both inclusive) in the 11th, 12th, 13th and 14th concessions; the Islands in Lake Simcoe contiguous to the townships and portions of townships above described lying wholly or for the most part opposite thereto.

7.—The Township of Nottawasaga, except that portion lying north of lots Nos. 18 in the 12 concessions thereof; the Township of Sunnidale, except that portion lying north of the 8th concession; that portion of the Township of Vespra lying west of the Nottawasaga river; that portion of the Township of Essa lying north of lots Nos. 19 in the 1st, 2nd, 3rd, 4th, 5th and 6th concessions; that portion of the Township of Tossorontio, lying north of lots Nos. 20, in each of the seven concessions thereof.

8.—The Township of Essa, except that portion lying north of lots Nos. 19, in each of the 11 concessions thereof; the Township of Tossorontio, except that portion lying north of lots Nos. 20, in each of the seven concessions thereof; that portion of the Township of Innisfil, being composed of lots Nos. 1, 2, 3, 4 and 5, in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th concessions; the 12th, 13th, 14th and 15th concessions of the Township of Tecumseth; lots Nos. 1, 2, 3, 4 and 5, in the 14th and 15th concessions of the Township of West Gwillimbury; that portion of the Township of Adjala, lying north of lots Nos. 25 in the eight concessions thereof.

9.—The Town of Penetanguishene, and the Village of Midland, the Township of Tiny; that portion of the Township of Tay, lying west of the 8th concession; the islands in Lake Huron contiguous to the Township of Tiny, and to that part of the Township of Tay, forming part of the ninth division, and lying wholly, or for the most part, opposite thereto.

10.—The Township of Matchedash, that portion of the Township of Orillia, northern division, lying north of lots Nos. 15, in the first seven concessions thereof; that portion of the Township of Medonte, lying north of lots Nos. 6 in the 11th, 12th, 13th and 14th concessions, and that portion lying north of lots Nos. 10, in the 9th and 10th concessions thereof; the Township of Tay, except that portion lying west of the 8th concession; the Island in Lake Huron, contiguous to that part of the Township of Tay, forming part of the 10th division, and lying wholly, or for the most part, opposite thereto.

Note.—Each of the said several Divisions shall include all allowances for roads embraced within its external limits, and shall also extend to the centre of every allowance for road lying external and adjacent to every such Division, excepting always where any such last-mentioned allowance is hereinbefore declared to belong to or form part of any particular Division.

UNITED COUNTIES OF STORMONT, DUNDAS AND GLENGARRY.

1.—Township of Charlottenburg, in the County of Glengarry.

2.—Township of Lochiel, in the County of Glengarry.

3.—Town and Township of Cornwall, in the County of Stormont.

4.—Township of Osnabruck, in the County of Stormont.

5.—Township of Williamsburgh, in the County of Dundas.

6.—Township of Matilda, in the County of Dundas.

7.—Township of Mountain, in the County of Dundas.

8.—Township of Finch, in the County of Stormont.

9.—Township of Lancaster, in the County of Glengarry.

10.—Township of Winchester, in the County of Dundas.

11.—Township of Roxborough, in the County of Stormont.

12.—Township of Kenyon, in the County of Glengarry.

DISTRICT OF THUNDER BAY.

1.—All that part of the District lying west of the meridian of 87 degrees of wes longitude, to the meridian of the most easterly part of Hunter's Island, excepting therefrom the Municipality of Neebing.

2.—

3.—Comprising the Municipality of Neebing.

COUNTY OF VICTORIA.

1.—The first consists of the following townships and parts of townships, viz. : of the 15th concession of the Township of Mariposa, and the Township of Eldon, except the ranges north and south of Portage Road.

2.—The second consists of the following Townships : all of the Townships of Fenelon, except that portion lying east of the Scugog River, and south of Sturgeon Lake, and the Township of Summerville.

3.—The third consists of the Township of Verulam.

4 —The fourth consists of the Township of Emily.

5.—The fifth consists of the Town of Lindsay, Township of Ops, and that portion of the Township of Fenelon, lying east of the Scugog River, and south of Sturgeon Lake.

6.—The sixth consists of the Township of Mariposa, except the 15th concession.

7. The seventh consists of the Townships of Carden and Dalton, Laxton, Digby and Longford, and the Township of Bexley, and that portion of the Township of Eldon north of Portage Road, and the Range south of Portage Road.

COUNTY OF WATERLOO.

1.—All that portion of the Township of Waterloo, lying north of the Block line on the west side of the Grand River, and that part of the Upper Block of said Township, lying on the east side of the Grand River, north of lots Nos. 115, 109, 104, 86 and 95 to the Guelph Township line, including the Towns of Berlin and Waterloo.

2.—All that part of the Township of Waterloo, lying south of the Block Line, on the west of the Grand River, and that part lying on the east side of the Grand River, south of the northern boundary of lots Nos. 115, 109, 104, 86 and 95, to the Guelph Township line, including the Villages of Preston and Hespeler.

3.—All that part of the Township of North Dumfries, lying east of lot No. 19, in the 7th concession, and running a course with the eastern boundary of the said lot in a northerly direction up to the 12th concession; thence along the eastern boundary of lot No. 23, in the said 12th concession, to the township line, including the Town of Galt.

4.—All that part of the Township of North Dumfries lying west of lot No. 18, in the 7th concession; thence along the western limits of said lot No. 18, the same course thereof, in a northerly direction to the 12th concession; thence along the westerly limit of lot No. 22 to the township line, including the Village of Ayr.

5.—The Township of Wilmot, including the Village of New Hamburg.

6.—The Township of Wellesley.

7.—The Township of Woolwich.

COUNTY OF WELLAND.

1.—Comprising the Township of Crowland; that part of the Township of Thorold, lying south of the line between lots 178 and 195, running through to Pelham; that part of Pelham, lying south of the 4th concession, and that part of Humberstone, lying north of the concession line, between the 4th and 5th concessions, being the whole of the 5th concession and the Town of Welland.

2.—Comprising the Township of Wainfleet.

3.—Comprising the Township of Bertie, and those parts of the Township of Humberstone not included in Nos 1 and 6, and the Village of Fort Erie.

4.—Comprising the Township of Willoughby, the Village of Chippewa, and that part of the Township of Stamford, south of the line between lots 136 and 137; easterly from the western limit of the Township to the south-east angle of lot No. 133; thence north on the line between lots Nos. 132 and 133, to the northern boundary of the township, including the Town of Clifton and Navy Island.

5.—Comprising those parts of the Townships of Stamford, Thorold and Pelham, not included in any other Division, and the Town of Thorold.

6.—Comprising all the Township of Humberstone, lying south of the 5th concession and west of the side-lines, between lots Nos. 9 and 10 in the several other concessions thereof, and the Village of Port Colborne.

COUNTY OF WELLINGTON.

1.—The Town and Township of Guelph.

2.—The Township of Puslinch.

3.—The Township of Eramosa.

4.—Consisting of the Township of Nicol, except the 11th and 12th concessions; the Municipality of Fergus; the first eight concessions of the Township of Garafraxa, and lots 1 to 18, both inclusive, in concessions A and B of the Township of Peel, lots 13, 14, 15, 16, 17 and 18, in concessions 18 and 19, and lots 19, 20 and 21 in the 17th concession of the Township of Peel.

5.—The Township of Erin.

6.—Consisting of the Township of Pilkington and the 11th and 12th concessions of the Township of Nicol; the Municipality of the Village of Elora; and lots numbers 19 and upwards, belonging to the 9th, 10th, 11th, 12th, 13th, 14th, 15th, and 16th concessions of Peel.

7.—Consisting of the first seven concessions of the Townships of Peel and Maryboro'.

8.—Consisting of that part of the Township of Arthur, south and south-east of lot 15, on the west side of the Owen Sound Road; lot 16 on the Owen Sound Road, and lot 12 east of the Owen Sound Road, in the Township of Arthur; that part of the Township of Luther, from lots 1 to 16, both inclusive; and lots 1 to 12, both inclusive, of the 17th and 18th concessions of the Township of Peel; lots 5 to 11, both inclusive, of the 19th concession of said township of Peel; and lots 19 to 23, both inclusive, of concessions "A" and "B," of said Township of Peel.

9.—The territory formerly comprised in this Division is now in the County of Dufferin.

10.—Consists of the Township of Minto.

11.—Consists of the Town of Mount Forest, and that part of the Township of Arthur north of lot 16, west of the Owen Sound Road; lot 17, on the Owen Sound Road, and lot 13, east of the Owen Sound Road.

12.—Consists of concessions 8 to 16, both inclusive, of the Township of Maryboro'; and concessions 8 to 16, both inclusive, of the Township of Peel, except lots 19, 20, 21, 22 and 23 of those concessions in that Township.

COUNTY OF WENTWORTH.

1.—All that part of the Township of Barton lying east of the line between lots 14 and 15, and all that part of Hamilton City east of Hughson Street.

2.—The whole of the Township of Flamboro' West.

3.—The whole of the Township of Flamboro' East.

4.—The whole of the Township of Beverley.

5.—The whole of the Township of Saltfleet.

6.—The whole of the Township of Ancaster.

7.—The whole of the Township of Glanford.

8.—The whole of the Township of Binbrook.

9.—All that part of the Township of Barton lying west of the line between lots 14 and 15, and that part of Hamilton City west of Hughson Street.

COUNTY OF YORK.

1.—The City of Toronto, east of Yonge Street.

2.—Concessions 5 to 11, inclusive, of the Township of Markham; and concessions 5 to 10, inclusive, of the Township of Whitchurch, from 1 to 10, inclusive; together with the Villages of Markham and Stouffville.

3.—Concessions 1 to 4, inclusive, of the Township of Markham; and concessions 1 to 4, inclusive, of the Township of Whitchurch from lot 1 to 10, inclusive; and concessions 1 to 3, inclusive, of the Township of Vaughan.

4.—The Township of Whitchurch, from the line between lots 10 and 11, northward; and the Township of East Gwillimbury.

5.—The Townships of Georgina and North Gwillimbury.

6.—The Township of King and the Incorporated Village of Aurora.

7.—Concessions 4 to 11, inclusive, of the Township of Vaughan.

8.—All that portion of the Township of York lying west of Yonge Street, and the Township of Etobicoke.

9.—The Township of Scarboro' and all that portion of the Township of York which lies east of Yonge Street, and the Village of Leslieville.

10.—The City of Toronto, west of Yonge Street.

RETURN shewing the number of Judgment Debtors who, during the twelve months ending 31st December, 1885 and 1886, were ordered to be committed under each of the five heads mentioned in the 182nd section of the Division Courts Act; also the total of such orders; the total of commitments; the percentage of orders to commit; the percentage of committals under judgment summonses issued; the average percentage of orders to commit in each County; the average percentage of committals under judgment summonses issued in each County, and the average percentage of committals of the number of orders to commit.

COUNTY, UNITED COUNTIES OR DISTRICT.	1st Head. Where debtor has not attended as required by summons, or alleged sufficient cause for not so attending.		2nd Head. Where debtor has refused to be sworn or make the required disclosures.		3rd Head. Where debtor has not answered touching his estate and effects to the satisfaction of the judge.		4th Head. Where debt is incurred by false pretence, fraud, breach of trust, or was wilfully contracted without reasonable expectation of being able to pay same, or where debtor has transferred, removed or concealed his property with intent to defraud.		5th Head. Where it appeared to the Judge that debtor when summoned, or since judgment obtained, had sufficient means to pay and neglected or refused to pay when ordered.		Total of such orders.		Total of Commitments.		Percentage of orders to commit of the number of Judgment Summonses issued.		Percentage of committals under Judgment Summonses issued.	
	1885.	1886.	1885.	1886.	1885.	1886.	1885.	1886.	1885.	1886.	1885.	1886.	1885.	1886.	1885.	1886.	1885.	1886.
Algoma	1	2	.....	.....	.....	.....	.....	.....	2	.....	3	2	1	.....	42.8	20.	9.	.....
Brant	16	11	.....	.....	.....	.....	.....	.....	7	4	23	15	.....	3	19.	14.2	.....	.2
Bruce	19	35	.....	.....	.....	.....	2	3	25	17	46	55	1	2	20.2	28.2	.4	1.
Carleton	167	138	.....	.....	.....	1	2	7	6	3	175	149	14	8	31.3	29.2	1.5	1.5
Dufferin	21	8	.....	.....	3	1	.....	.....	.....	.....	24	9	2	.....	17.5	12.3	1.4	.....
Elgin	35	30	.....	.....	.....	2	.....	.....	.....	.....	35	32	5	5	19.	21.4	2.7	3.3
Essex	105	95	.....	.....	25	5	.....	.....	.....	2	130	102	.....	5	46.3	36.	.....	1.7
Frontenac	37	31	2	.....	.....	.....	.....	.....	2	6	41	37	....	2	43.6	39.3	.....	2.1
Grey	105	73	.....	....	1	3	2	1	31	22	139	99	12	7	51.8	35.2	4.4	2.4
Haldimand	2	7	.....	.....	.....	.....	.....	.....	.....	1	2	10	.....	2	5.7	18.	.....	3.7
Haliburton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Halton	6	5	.....	.....	.....	.....	.....	.....	17	14	23	19	1	1	23.4	25.6	1.	1.3
Hastings	41	43	.....	.....	1	3	.....	.....	1	7	43	53	....	1	25.9	20.1	.....	.4
Huron	63	39	.....	.....	.....	.....	.....	.....	10	6	73	45	2	3	37.4	24.1	1.	1.6
Kent	175	116	.....	.....	.....	.....	.....	.....	19	15	194	131	7	7	27.4	27.6	1.	1.4
Lambton	26	26	.....	.....	.....	.....	.....	.....	2	2	28	28	1	1	20.5	24.5	.7	.8
Lanark	20	37	.....	.....	.....	.....	.....	.....	.....	2	30	27	1	3	36.5	27.8	1.2	3.1
Leeds and Grenville	21	26	.....	.....	.....	2	1	.....	7	6	29	34	4	1	17.2	16.2	2.3	.4
Lennox and Addington	48	49	.....	.....	...	1	.....	.....	.....	2	48	52	5	3	27.5	34.6	2.8	2.

Lincoln	15	12				1				2	15	15	2	1	13.5	15.	1.8	1.
Middlesex	66	73			1	2	2		1	3	70	78	8	9	26.5	29.5	3.	3.4
Muskoka	3	4				1					3	5			7.7	21.7		
Nipissing	2	2									2	2			40.	13.3		
Norfolk	17	23							8	14	25	37	3	6	12.8	19.	1.5	3.1
Northumberland and Durham	44	71	1		1	1			31	2	77	74	2	2	22.8	16.1	.6	.4
Ontario	36	30	1		3	2			2	7	42	39	3	2	18.	18.5	1.2	.9
Oxford	39	56			1				15	14	55	70	5	3	20.9	20.5	1.9	.8
Parry Sound	3										3			1	18 7			4.
Peel	20	14							2	4	22	18	3	1	19.8	18.7	2.7	.9
Perth	129	102	1				1	1	1	3	132	106	9	8	72.9	57.9	4.9	4.3
Peterborough	2										2	8	1		11.1	18.6	5.5	
Prescott and Russell	16	22									16	22	2		27.1	32.8	3.4	
Prince Edward	1	4								1	1	5	1		3.3	19.2	3.3	
Rainy River																		
Renfrew	36	25				1		1	6	5	43	29	5	1	45.7	38.1	5.3	1.3
Simcoe	117	112			9	7			5	3	131	122	11	9	29.7	26.2	2.5	1.9
Stormont, Dundas and Glengarry	9	13				1				3	9	17		3	8.2	9.3		1.6
Thunder Bay																		
Victoria	4	4				1			3	3	7	8	2	1	7.2	11.1	2.	1.4
Waterloo	4	4									4	4			8.7	11.4		
Welland	28	15							4	5	32	20	5	3	22.8	14.6	3.5	2.2
Wellington	14	15							13	12	27	27	1		18.6	19.5	.7	
Wentworth	5	9							6	4	11	13	3	1	9.4	13.1	2.5	1.
York	278	430							76	78	354	508	10	8	26.2	34.4	.7	.5
	1796	1811	5		45	35	11	13	302	270	2059	2126	132	113				

	1885.		1886.
Average percentage of Orders to Commit of the number of Judgment Summonses issued	25.4	..	26.8
Average percentage of Committals under Judgment Summonses issued	1.6	..	1.4
Average percentage of Committals of the number of Orders to Commit	6.4	..	5.3

DIVISION COURT TARIFF.

Fees to be received by the several Clerks and Bailiffs of Division Courts in Ontario, from and after the first day of January, 1885 :—

FORM 133.

Schedule of Clerks' Fees.

1. Receiving claim, numbering and entering in Procedure Book $0 15
   (This item to apply to entering in the Procedure Book a transcript of judgment from another Court, but not an entry made for the issue of a judgment summons.)

2. Issuing summons, with necessary notices and warnings thereon, or judgment summons (as provided in the forms), in all,
   Where claim does not exceed $20 ..... 0 40
   " exceeds $20, and does not exceed $60 ..... 0 50
   " exceeds $60, and does not exceed $100 ..... 0 60
   " exceeds $100 ..... 1 00
   [*N. B.*—In replevin and interpleader suits the value of goods to regulate the fee.]

3. Copy of summons, including all notices and warnings thereon 0 20

4. Copy of claim (including particulars), when not furnished by plaintiff (to be paid by the plaintiff) 0 20

5. Copy of set-off (including particulars), when not furnished by the defendant (to be paid by the defendant) 0 20

6. Receiving and entering bailiff's return to any summons, writ or warrant issued under the seal of the Court (except summons to witness and return to summons, or papers from another Division) 0 15

7. Entering and noting every defence or notice of admission in Procedure Book. 0 25
   (To be paid in the first instance by the defendant or other person entering it, but it may be afterwards taxed against the plaintiff, should costs be given against him.)

8. Taking confession of judgment 0 10
   (This does not include affidavit and oath chargeable under item 9.)

9. Every necessary affidavit, if actually prepared by the clerk, and administering oath to the deponent 0 25

10. Copies of papers for which no fee is already provided, necessarily required for service of transmission to the Judge—each 0 10

11. Every notice of defence or admission entered, or other notice required to be given by the Clerk to any party to a cause or proceeding, or to the Judge in respect to the same, and mailing 0 15

12. Entering final judgment by Clerk on special summons, where claim is not disputed 0 50

13. Entering every judgment rendered at the hearing or final order made by the Judge $0 50
(This one fee of 50 cents will include the service of recording at the trial and afterwards entering in the Procedure Book, the judgment, decree and order in its entirety rendered or made at the trial. In a garnishee proceeding before judgment the fee of 50 cents will be allowed for the judgment in respect to the primary debtor, and a like fee of 50 cents for the adjudication, whenever made, in respect to the garnishee.)

14. Subpœna to witness 0 15
(The subpœna may include any number of names therein, and only one original subpœna shall be taxed, except the Judge otherwise orders.)

15. For every copy of subpœna required for service 0 05

16. Summons for each juryman when called by the parties 0 10
(Only 25 cents in all is to be allowed for returning a Judge's jury.)

17. Every order of reference or order for adjournment made at hearing, and every order requiring the signature of the Judge, and entering the same 0 25
(Any warning necessary with order—*e.g.*, the warning in form 42—forms part of the order.)

18. Transcript of judgment (under section 161 or 165)..... 0 25

19. Every writ of execution, warrant or attachment. or warrant for arrest of delinquent, and delivering same to Bailiff..... 0 50

20. Renewal of every writ of execution when ordered by the judgment creditor.. 0 15

21. Every bond, when necessary, and prepared by the Clerk (including affidavit of justification 0 50

22. For necessary entries in the Debt Attachment Book in each case (in all)..... 0 20

23. Transmitting transcript of judgment, or transmitting papers for service to another Division, or to Judge on application to him, including necessary entries, but not postage..... 0 25

24. Receiving papers from another Division for service, entering the same, handing to the Bailiff, receiving and entering his return, and transmitting the same, (if returns made promptly, not otherwise)..... 0 30
(This fee does not include a charge for receiving transcript of judgment, for which a fee of 15 cente is taxable under item 1.)

25. Search by person not party to the suit or proceeding to be paid by the applicant, 10 cents; search by party to the suit or proceeding, where service is over one year old 0 10
(No fee is chargeable for search to a party to the suit or proceeding, if the same is not over one year old.)

26. Taxing costs in defended suits. 0 25

Rule No. 175 of the Rules of Practice of Division Courts.—On payment of a fee of 5 cents, every clerk, when required by parties paying costs, shall give a statement, in writing, of items in detail, or transmit the same by postal card.

FORM 134.

SCHEDULE OF BAILIFFS' FEES.

1. Service of summons, writ or warrant issued under the seal of the Court, or Judge's summons on each person (except summons to witness and summons to juryman),
   Where claim does not exceed $20 ..... $0 30
   " exceeds $20, and does not exceed $60 ..... 0 40
   " exceeds $60, and does not exceed $100 ..... 0 50
   " exceeds $100 ..... 0 75
   (In interpleader suits the value of the goods to regulate the fee.)

2. For every return as to service of summons, attending at the Clerk's office, and making the necessary affidavit (as provided by Rule 90) 0 15

3. Service of summons on witness or juryman, or service of notice 0 15

4. Taking confession of judgment, or attending to prove 0 10

5. For calling parties and their witnesses at the sittings of the Court, in every defended case, as provided by Rule 91, amended by Rule 168 ..... 0 15

6. Enforcing every writ of execution, or summons in replevin, or warrant of attachment, or warrant against the body—each
   Where claim does not exceed $20 ..... 0 50
   " exceeds $20, and does not exceed $60 ..... 0 75
   " exceeds $60 ..... 1 00
   (Executing summons in replevin includes service on defendant. The value of the goods to regulate the amount of the fee.)

7. Every mile necessarily travelled to serve summons or process, or other necessary paper, or in going to seize on attachment, or in going to seize on a writ of execution, where money made or case settled after levy 0 12
   (In no case is mileage to be allowed for a greater distance than from the Clerk's office to the place of service or seizure.)

8. Mileage to arrest delinquent under a warrant to be at 12 cents per mile, but for carrying delinquent to prison, including all expenses, and assistance, per mile 0 20

9 Every schedule of property seized, attached, or replevied, including affidavit of appraisal, when necessary,
   Not exceeding $20 ..... 0 30
   Exceeding $20, and not exceeding $60 ..... 0 50
   Exceeding $60 ..... 0 75

10. Every bond, when necessary, when prepared by the Bailiff (including affidavit of justification) 0 50

11. Every notice of sale not exceeding three, under execution or under attachment, each 0 15

12. There shall be allowed to the Bailiff for removing or retaining property seized under execution or attached, reasonable and necessary disbursements and allowances, to be first settled by the Clerk, subject to appeal to the Judge.

13. There shall be allowed to the Bailiff five per cent. upon the amount realized from the sale of property under any execution, but such percentage not to apply to any overplus thereon.

(But if execution be satisfied in whole or in part, after seizure and before sale, the Bailiff to be entitled to charge and receive three per cent. on the amount realized.)

RETURN

To an Order of the Legislative Assembly, passed on the 23rd day of March, 1887, for a Return shewing as to each vacancy which has occurred since the first day of January, 1884, in the offices of Sheriff, Registrar of Deeds or County Crown Attorney; when the vacancy occurred; how it was created; when it was filled; by whom it was filled; and shewing also which of such vacancies still remain unfilled.

ARTHUR S. HARDY,
Secretary.

Office of the Provincial Secretary,
Toronto, February 9th, 1888.

(*Mr. Meredith.*)

RETURN shewing as to each vacancy which has occurred since the first day of January, 1884, in the offices of Sheriff, Registrar of Deeds or County Crown Attorney; when the vacancy occurred; how it was created; when it was filled; by whom it was filled; and also which of such vacancies remained unfilled on 23rd March, 1887.

OFFICE.	COUNTY, ETC.	DATE OF VACANCY.	HOW VACANCY CREATED.	WHEN VACANCY FILLED.	BY WHOM FILLED.	REMARKS.
County Attorney	Prescott and Russell	31st December, 1883	Resigned	9th January, 1884	John Maxwell.	
Registrar	Peterboro'	9th December, 1882	Deceased	19th January, 1884	Bernard Morrow.	
Registrar	Peel	2nd May, 1883	Deceased	19th January, 1884	Alexander Dick.	
Sheriff	Essex	14th December, 1883	Removed	19th January, 1884	J. C. Iler.	
Registrar	Perth	January, 1884	Deceased	29th January, 1884	D. D. Hay.	
Sheriff	Elgin	2nd February, 1884	Deceased	14th February, 1884	Dugald Brown.	
Sheriff	Leeds and Grenville	6th August, 1883	Deceased	11th February, 1884	J. Smart.	
Sheriff	Northumberland & Durham	28th February, 1884	Resigned	29th February, 1884	J. O. Proctor.	
Registrar	Kingston City	April, 1884	Deceased	7th May, 1884	J. P. Gildersleeve.	
County Attorney	Hastings	May, 1884	Deceased	10th May, 1884	G. E. Henderson.	
Registrar	Norfolk	August, 1884	Deceased	26th September, 1884	A. J. Douly.	
County Attorney	Thunder Bay	No previous	Appointment	24th October, 1884	A. R. Lewis.	
County Attorney	Algoma	30th October, 1884	Resigned	8th November, 1884	J. J. Kehoe.	
Sheriff	Victoria	10th March, 1885	Deceased	7th May, 1885	John McLennan.	
Registrar	Rainy River	No previous	Appointment	16th May, 1885	F. J. Apjohn.	
Sheriff, *pro tempore*	Brant	10th August, 1885	Deceased	11th August, 1885	Alfred Kitchen.	
Sheriff	Rainy River	No previous	Appointment	5th August, 1885	J. McQuarrie.	
Sheriff	Brant	10th August, 1885	Deceased	16th September, 1885	W. J. Scarfe.	
Registrar	Middlesex	November, 1884	Deceased	6th January, 1886	J. Walker.	
County Attorney	Elgin	April, 1886	Resigned	19th April, 1886	D. J. Donahue.	
Clerk of the Peace	Elgin	30th August, 1886	Deceased	30th August, 1886	D. J. Donahue.	By virtue of his office as County Attorney.
Registrar	Oxford		Deceased	14th August, 1886	G. R. Patullo.	
Registrar	Carleton	24th December, 1885	Deceased	26th March, 1887	P. J. Coffey.	
County Attorney	York	31st January, 1886	Deceased	26th March, 1887	G. W. Badgerow.	
Registrar	Lennox and Addington	4th November, 1886	Removed	26th March, 1887	Stephen Gibson.	
County Attorney	Peterboro'	25th March, 1886	Resigned	30th March, 1886	R. E. Wood.	
Sheriff	Prescott and Russell	29th March, 1887	Deceased	13th April, 1887	Albert Hagar.	
Sheriff	Wellington	26th February, 1886	Deceased	18th October, 1887	Robert McKim.	
Sheriff	Lincoln	11th August, 1886	Deceased	28th May, 1887	Thomas C. Dawson.	
Registrar	Peel	March, 1887	Deceased	22nd March, 1887	James Fleming.	

CORRESPONDENCE

Relative to the appointment of Queen's Counsel by the Federal and Provincial Governments.

Presented to the Legislative Assembly of Ontario.

By Command,

ARTHUR S. HARDY,
Provincial Secretary.

Provincial Secretary's Office,
Toronto, 14th February, 1888.

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DESPATCHES.

[1. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State,
Ottawa, 28th Sept., 1885.

Sir,—I have the honour to inform you that it is considered desirable that a correct list of the various Queen's Counsel in the old Provinces who still survive, and those appointed since 1867 who survive,should be made up and transmitted through the proper channel to the Right Honourable the Secretary of State for the Colonies for his information and that of the Judical Committee of the Honourable the Privy Council.

I have, therefore, the honour to request that your Government may be moved to have prepared and transmitted to me a correct list of the Queen's Counsel in the Province of Ontario who were appointed prior to 1867 and who still survive.

I have, etc.,

(Signed) G. POWELL,
Under Secretary of State.

His Honour
The Lieutenant-Governor of Ontario,
Toronto.

[2. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State,
Ottawa, 4th December, 1885.

Sir,—I am directed to call your attention to the Circular from this Department No. 3627 on 10530 of the 28th September last, and to request that the information therein asked for be furnished at your early convenience.

I have, etc.,

(Signed G. POWELL,
Under Secretary of State.

His Honour
The Lieutenant-Governor of Ontario,
Toronto.

[3. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State,
Ottawa, 30th December, 1885.

Sir,—I am directed to request that you may be pleased to invite the attention of your Government to the Circular letter from this Department of the 28th September last, expressing a desire that your Government may be moved to have prepared and transmitted to me a correct list of the Queen's Counsel for the Province of Ontario who were appointed prior to 1867, and who still survive.

I have etc.,
(Signed) J. A. CHAPLEAU,
Secretary of State.

His Honour
The Lieutenant-Governor of Ontario,
Toronto.

[4. The Lieutenant-Governor to the Secretary of State.]

Government House,
Toronto, 9th January, 1886.

Sir,—Adverting to the request contained in your despatch of the 30th ultimo (No. 5316 on 10530), I have the honour to inform you that there appears to be no official record in any of the Departments of my Government of the appointments of Queen's Counsel made before 1st July, 1867. There is, however, in preparation a list derived from other sources, and believed to be correct, which I hope will be ready for transmission in a few days.

When your despatch of the 28th September last was received the matter was not supposed to require instant action, and the pressure of business meanwhile has prevented rom receiving earlier attention.

I have, etc.,
(Signed) J. B. ROBINSON,
Lieutenant-Governor of Ontario.

The Honourable
The Secretary of State,
Ottawa.

[5. The Lieutenant-Governor to the Secretary of State,]

Government House,
Toronto, 22nd January, 1886.

Sir,—With reference to your despatches of 28th September, and 5th and 30th December, 1885, I have the honour to enclose a list, believed to be correct, of the Queen's Counsel appointed for Upper Canada before Confederation; omitting those who have since died and those who are now Judges.

Your despatch of 28th September did not suggest any desire or occasion for haste; the information you requested, not being found in any department of my Government, had to be obtained elsewhere, and, other public business pressing, the preparation of the list was not completed until after your latest despatch.

I likewise send a List of those members of the Ontario Bar who hold Commissions as Queen's Counsel from the Lieutenant-Governor, and not also from the Dominion. Three of these gentlemen are members of my Government; a fourth was for some years Deputy Attorney-General and is now Master of Titles under the recent Land Titles Act; the others have been much employed in Crown business for the Province; and all stand high, professionally and personally, in their respective localities. They received their Commissions as Queen's Counsel in 1876, and have ever since been recognised as such in all Provincial Courts, without objection or question by the Bench or from other Counsel at the Bar.

You state that the object of obtaining a list of the appointments before July, 1867, is to transmit it through the proper channel to the Right Honourable the Secretary of State for the Colonies for his information and that of the Judicial Committee of the Privy Council; and I understand from your despatch that you contemplate transmitting also the names of the gentlemen who have been appointed Queen's Counsel by the Dominion Government. You do not ask for a list of those appointed by the Lieutenant-Governor; and it is presumed, therefore, that you intend to ignore these, and to treat as *ultra vires* the Ontario Statutes (passed in 1873) under which the Provincial Commissions were granted. My Government respectfully protest against this course, as misleading to their Lordships of the Judical Committee, as unjust to Provincial Queen's Counsel, and as proceeding on an erroneous conception of the B. N. A. Act, which involves other matters of great moment to the Provinces.

I beg to remind you that the Provincial Statutes which your Government purpose treating as invalid, were passed in accordance with the repeatedly expressed opinions of your Premier, and it may even be said at his suggestion. The Ontario Government have always claimed for the Lieutenant-Governor the power *virtute officii* under the B. N. A. Act to issue such Commissions; but there being a difference of opinion on that point, and there being on the other hand a consensus of opinion, Imperial, Federal and Provincial, that a Statute by a Provincial Legislature providing for such appointments would be valid, the Ontario Government, to prevent any possible doubt as to the validity of Provincial Commissions, procured the passing of the Acts referred to. These Acts were acquiesced in by the Dominion authorities at the time, and no communication on the subject has since been made to the Ontario Government, except in your recent despatches.

My Government insist that the Ontario Legislature had a right to pass these Statutes, and that, if the Premier of your Government and his colleagues now regard the Acts and Commissions as *ultra vires*, this changed view ought not to be acted upon in your intended communication or otherwise, unless and until the invalidity of the Acts is established by judical authority, after full argument, in some proceeding to which this Province is a party. For this purpose the Ontario Government proposed as long ago as 1872, "that the opinion of the Judical Committee of the Privy Council should be

taken on a joint Case to be argued on behalf of the respective Governments." This proposal had reference to the power of the Lieutenant-Governor to make such appointments without previous legislation. The proposal was then declined. My Government would still gladly concur in a reference of the whole matter to their Lordships on a joint Case to be agreed to and argued on behalf of the respective Governments.

It may here be useful to recall the history of this matter of appointing Queen's Counsel in the Dominion, and in the Provinces which constitute the Dominion.

Before Confederation such appointments were from time to time made in each of the Provinces by the Governor-General or Lieutenant-Governor by the advice and at the instance of his Executive Council ; and from the time of Responsible Government being conceded, no appointments of Queen's Counsel were made otherwise ; Her Majesty's advisers in England took no part therein.

Some years after Confederation the question as to the proper authority for then making such appointments arose on the occasion of additional Queen's Counsel being wanted in New Brunswick. An *ex parte* Case was thereupon prepared by Sir John Macdonald, then as now the Dominion Premier, and then also Minister of Justice, for the opinion of the Law Officers of the Crown in England.

This case was in the form of a report to his Excellency the Governor-General, and was dated 3rd January, 1872. The Case so prepared and reported stated (among other things), that the question had been raised by the Government of Nova Scotia, as to whether they had the power of appointing Queen's Counsel for their Province, their own opinion being (the case stated) that they had no such power. The Minister was "of opinion that as a matter of course Her Majesty had directly, as well as through her representative the Governor-General, the power of selecting from the bars of the several Provinces her own Counsel, and as *fons honoris* of giving them such precedence and preaudience in her courts as she thought proper." He stated that it was "held by some that Lieutenant-Governors of the Provinces, as they are now not appointed directly by her Majesty, but by the Governor-General under the B. N. A. Act, 1867, do not represent her sufficiently to exercise the royal prerogative without positive statutory enactment." The case further stated that this seemed "to have been the view of Her Majesty's Government in 1864, when they refused to confer the pardoning power on the Lieutenant-Governors ;" but that on the other hand it was "contended that the 64th and 65th clauses of the Act continued to the Lieutenant-Governors the power of appointing Queen's Counsel which they exercised while holding Commissions under the Great Seal of England ;" and that "reference was also made to the 63rd section by which the Lieutenant-Governors of Ontario and Quebec appoint Attorneys-General, and the Lieutenant-Governor of Quebec, also a Solicitor-General." The Minister further observed that, "however this might be, it would be seen that by the 92nd section of the Act, it is provided that the Legislature of each Province may make laws in relation to 'the administration of justice in the Province, including the constitution, maintenance and organization of Provincial Courts, both of civil and criminal jurisdiction, and including procedure in civil matters in those courts ;'" and that under this power he was "of opinion that the Legislature of a Province, being charged with the administration of

justice and the organization of the courts," might "by statute provide for the general conduct of business before those courts," and might "make such provisions with respect to the bar, the management of criminal prosecutions by counsel, the selection of those counsel, and the right of pre-audience," as such Legislature should see fit; that such an enactment must, "be subject to the exercise of the royal prerogative, which is paramount and in no way diminished by the terms of the Act of Confederation." The report concluded by stating the questions, to which answers by the Law Officers of the Crown in England were desired.

It is to be observed that the Case thus prepared and reported did not represent the matter as one of difference between the Dominion and Provincial authorities. On the contrary, the report stated that the Government of Nova Scotia were of opinion that they had no such power of appointment; and no other Province was mentioned in the Case; the opposite contention would naturally be supposed by the Law Officers in England to be by irresponsible persons whose contention was entitled to little consideration; and the Case mentioned three sections only of the Act, as those on which the Provincial right, if any, was contended for by these persons.

If before preparing the Case, communication had been had with Ontario and the other Provinces of the Dominion, it would have been ascertained, and the Imperial Law Officers would have been informed, that whatever opinion the Government of Nova Scotia entertained on the point, the Government of Ontario, and probably the Governments of all the other Provinces, claimed for the Lieutenant-Governors the power referred to, and that the claim was founded, not on the three sections mentioned but on the whole scope of the Act, as well as on other grounds which I shall state hereafter.

This very imperfect Case was transmitted on the 4th January, 1872, to the Right Honourable the Secretary of State for the Colonies; and the Earl of Kimberley, who then held that office, replied by a despatch dated 1st February of the same year. In this despatch his Lordship stated that, in compliance with the request made to him, he had taken the opinion of the Law Officers of the Crown; that he was "advised that the Governor-General has now power as Her Majesty's representative to appoint Queen's Counsel, but that a Lieutenant-Governor appointed since the union came into effect has no such power of appointment;" that he was further "advised that the Legislature of a Province can confer by statute on its Lieutenant-Governor the power of appointing Queen's Counsel, and that with respect to precedence or pre-audience in the Courts of a Province, the Legislature of the Province has power to decide as between Queen's Counsel appointed by the Governor-General and the Lieutenant-Governor, as above explained."

The opinion intimated on behalf of the Dominion Government that a Provincial Legislature had power to pass such Acts as those in question was therefore the opinion likewise of the Law Officers of the Crown in England, and was adopted by Her Majesty's Secretary of State for the Colonies and transmitted to His Excellency the Governor-General for the information and guidance of all whom the matter might concern.

This despatch was not communicated to the Government of Ontario; and, not being aware of it, the Lieutenant-Governor, on the 16th of March, 1872, issued commissions appointing certain members of the Bar of the Province, to be Queen's Counsel therein, and their appointments appeared in the *Ontario Gazette* immediately afterwards. On the

28th September, 1872, the Minister of Justice reported to His Excellency the Governor-General that it appeared by the *Ontario Official Gazette* that these appointments had been made; and the Minister stated (amongst other things), that, "being of opinion that, in the absence of legislation on the subject, the Lieutenant-Governor of a Province of the Dominion had not, since the 1st July, 1867, the right to exercise the Royal Prerogative in the appointment of Queen's Counsel, but that such power was vested in the Governor-General, as Her Majesty's representative, he had made a report to that effect; that this report had been transmitted for the opinion of the Law Officers of the Crown on the subject; "that by a despatch, dated first February last, Lord Kimberley had informed Lord Lisgar that the Governor-General had the power, but that a Lieutenant-Governor appointed since the union came into effect had not the power of appointment;" that, under the circumstances, great doubt must exist as to the validity of the Commissions issued to the gentlemen named; that, by the law of Upper Canada, Queen's Counsel can, in certain cases, at the request of a Judge of the Superior Courts, perform certain judicial duties, such as the trial of criminal cases; that their authority to act might be disputed, and that if it were eventually decided to be illegal, a failure of justice would be the consequence; and, "under these circumstances, as the gentlemen mentioned are fully qualified to perform the duties of Her Majesty's Counsel," the Minister recommended "that Commissions should be issued by the Government of Canada to those gentlemen, or to such of them as desired to receive the same."

The Minister thus in this report again intimated the opinion that such Provincial Acts as those in question were within the competence of a Provincial Legislature. The appointment of a Queen's Counsel by a Judge to perform judicial duties, it may be observed here, is of very rare occurrence.

The Committee of Council submitted the Minister's recommendation for His Excellency's approval, and it was approved accordingly. Letters were thereupon addressed to each of the gentlemen who had been appointed by the Lieutenant-Governor offering, "in order to remove all possible doubt as to the legality of his status as one of Her Majesty's Counsel for the Province of Ontario," that, if he desired, "a Commission would be issued under the Great Seal of Canada appointing him Queen's Counsel for Ontario."

One of these letters having been communicated to the Ontario Government, the Committee of the Executive Council made a report thereon to the Lieutenant Governor (23rd October, 1872), in which (amongst other things) they expressed regret that the Government of Canada, entertaining the view that the opinion of the Imperial Law Officers referred to in this letter was applicable to Ontario, should not have thought fit to transmit a copy of it for His Honour's information; that, although His Honour's Government was of the opinion that His Honour is invested with the power to make such appointments without legislation, yet had they been made aware of the view of the Law Officers, they would have thought it proper to propose the legislation requisite for the removal of any possible doubt on the subject; and, having now become aware of it, it was their intention to propose such legislation during the Session which was to commence within a few weeks. The Committee further stated that they purposely abstained from entering into any discussion of the constitutional point, but that they were bound to state

that, in their opinion, the matter involved questions of local and federal jurisdiction far wider than the single question under discussion, and that this rendered them the more anxious that the course they proposed should commend itself to His Excellency the Governor-General.

The report was approved by the Lieutenant-Governor; a copy was immediately transmitted to the then Secretary of State of Canada; and the Committee of the Dominion Privy Council made a report thereon (13 December 1872). In this report they set forth (amongst other things) the opinion obtained through the Colonial Secretary; and the statement of the Ontario Government that, although they were still of opinion that the Lieutenant-Governor had the power to grant such Commissions, it was their intention, in order to remove all doubt, to submit a measure to the Provincial Legislature on the subject; and the Report stated that the Committee could make no objection to that course being taken, and were on the whole of opinion as follows: "That His Excellency the Governor-General, as the Queen's Representative, should not refrain from appointing Her Majesty's Counsel; but they think an arrangement might advantageously be made between the Government of the Dominion and the several Provinces, by which Queen's Counsel, appointed by the Governor-General, would receive proper status and position in the Provincial Courts, and Commissions issued under Statutory authority by the Lieutenant-Governors would be recognised in the Courts of the Dominion."

Following the course affirmed by the Imperial and Dominion authorities to be proper and competent, the Ontario Legislature in following Session passed two Acts, forming chapters 3 and 4 of the Statutes of 1873; one, providing for the appointment of Queen's Counsel; and the other, regulating the precedence of the Bar of the Province. The first of these two Acts recited, that "in the course of the administration of justice, matters between the Crown and the subject are brought, some in Her Majesty's name and some in the name of the Attorney-General for Ontario, before Her Majesty's courts in Ontario, by the direction and under the control and management of the Provincial Government; and that the Lieutenant-Governor of right ought to have the power to appoint from among the members of the Bar of Ontario, Provincial Officers who may assist in the conduct of such matters on behalf of the Crown, under the name of Her Majesty's Counsel learned in the law for the said province; and that doubts have been cast on the power of the Lieutenant-Governor to make such appointments; and it is expedient to remove such doubts.

"Therefore Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows: It was and is lawful for the Lieutenant-Governor by letters patent, under the Great Seal of the Province of Ontario, to appoint from among the members of the Bar of Ontario, such persons as he may deem right, to be, during pleasure, Provincial Officers under the name of Her Majesty's Counsel learned in the law, for the Province of Ontario."

The second of the Ontario Acts recited that "the regulation of the Bar of Ontario is vested in the Provincial Legislature, and it is expedient for the orderly conduct of business before the Provincial Courts that provision be made for the order of precedence of the members of the said Bar in the said Courts."

"Therefore, Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario," provided for the precedence of the Bar in the Provincial Courts in the order therein mentioned, and further provided that "nothing in this Act contained shall in any wise affect or alter any rights of precedence which may appertain to any member of the Bar, when acting as counsel for Her Majesty, or for any Attorney-General of Her Majesty, in any matter depending in the name of Her Majesty or of the Attorney-General before the said Courts, but such right and precedence shall remain as if this Act had not been passed."

These Acts were allowed by His Excellency the Governor-General to go into operation. Some time afterwards Commissions for the Province were issued by the Lieutenant-Governor to several gentlemen as Queen's Counsel, including all to whom Commissions had previously been granted by the Dominion Government. Acts similar to the Ontario Acts were passed by the other confederated Provinces, and these also were allowed by the Dominion Government to go into operation without objection.

I am not aware that any question was raised as to the validity or construction of any of these Provincial Acts, until a question was suggested by Mr. Ritchie a member of the Nova Scotia Bar, who had received a patent as Queen's Counsel from the Dominion Government before the passing of the Nova Scotia Acts. Letters Patent issued by the Lieutenant-Governor of Nova Scotia purported to give to certain of the Queen's Counsel thereby appointed precedence over Mr. Ritchie. To this he objected, and the question came before the Supreme Court of Nova Scotia, consisting of five Judges, all of whom held the Provincial Acts in question to be valid Acts, and the objection to them to be quite untenable; but four of the five held that, according to the true construction of these Acts, it was not intended to disturb the precedence of Barristers theretofore appointed Queen's Counsel; and from this judgement an appeal was taken to the Supreme Court of Canada. The appeal was heard on the 30th January, 1879, by five of the Judges, the Chief Justice not being present. On this occasion the validity of the Provincial Acts was strongly contested by Counsel for the Respondent; and Counsel for the Appeal, not having anticipated any difficulty on that point, had not prepared himself to argue it, and confined his attention to other points involved. The following statement was made by him to the Court, and is given in the Official Report of the case: "I find the responsibility unexpectedly thrown upon me of defending the status hitherto claimed and enjoyed by Lieutenant-Governors and Provincial Legislatures, and I therefore do not profess to do so. As the subject was not discussed in the argument before the Superior Court of Nova Scotia, it was quite unexpected by me, and apparently also by the Respondent, who, in his factum, has given no authority or reference on this point, except the Governor-General's Commission, which as respects these questions is the same as before the union."*

Ontario or the other Provinces of the Dominion (except Nova Scotia) were not parties, and were not represented on the argument; nor were any of the Queen's Counsel who had been appointed in the Provinces other than Nova Scotia.

While, from the absence of argument by Counsel in support of the Provincial Acts, some of the Judges formed and expressed opinions against the validity of these Acts, the

* 3 Supreme Court Can. Reports, p. 594. 595.

only point actually decided by the Court was, that the Acts did not affect a Queen's Counsel previously appointed by the Governor-General. Three of the five Judges who heard the appeal concurred in the opinion of the Court below, that these Acts, according to the true construction of them, were not intended to affect such a case, and therefore, that the appeal did not call for any decision on the Constitutional question. One of the three, however, formed and expressed an opinion that the Acts were invalid, and two others gave their decision for the respondent on the express ground that the Acts were invalid. The opinion against their validity was, therefore, the opinion of three only of the six Judges of the Court. It was an opinion not necessary for the decision; it was opposed to the unanimous opinion of the five learned Judges of the Court appealed from; and was arrived at after an argument which the counsel for the appellants was unprepared for, and in a case in which the other Provinces of the Dominion—Ontario, Quebec and New Brunswick—were not parties, and were not represented.

It is a well-known fact that, notwithstanding this Case, all but one of the Queen's Counsel appointed by the Ontario Government continued to claim under their Commissions the status, and to exercise the rights and privileges, of Queen's Counsel in all Provincial Courts, and without objection from the Provincial Bench or Bar. Had any opportunity occurred, it was the intention of this Government to obtain a judicial decision on the question by the Provincial Courts, from which, at the instance of any party dissatisfied, there might be an appeal to the Supreme Court of Canada, and also to Her Majesty in Council; but the rights of the Provincial Queen's Counsel having been exercised in all the Courts without objection, there has hitherto been no opportunity of obtaining an appealable decision. The Dominion Government have within the last few weeks given Commissions as Queen's Counsel to several of the gentlemen who until then had held Provincial Commissions only; and the chance is not great of the question coming soon before our Courts, except on a Case agreed on for the purpose.

But as my Government concur with the Ontario Government of 1872, in regarding the matter as involving questions of legal and Federal jurisdiction far wider than the single question under discussion, they feel it their duty to the Province not to leave the intended communication to the Colonial Secretary, and the Judical Committee of the Privy Council, to be made without protest, and a formal statement of the Provincial view.

I am advised that the whole argument against the Provincial view is founded on the doctrine, that the appointment of Queen's Counsel is matter of prerogative, and that the Crown cannot be "divested" by Statute of any matter of prerogative, except by express words or necessary implication. It has even been affirmed that the Sovereign's "prerogative rights are rights inherent in the person of the Sovereign himself, which he alone, and without advice or consent, may exercise how and when he pleases." But my Government claim that this is not the constitutional rule as now recognised; that prerogative is not for the personal advantage of the Sovereign, but is a trust for the people; that at the present day the Sovereign exercises no prerogative right without the advice or consent of ministers who have the confidence of the people's representatives.

My Government further insist that the Queen's prerogatives, so far as they affect Canada, are trusts for the benefit, not of the people of England, but of the people here; that the theory of the B. N. A. Act is, that the Confederated Provinces may be better legislated for and better governed by their own representatives, than from the other side of the Atlantic; that the contrary notion had long before been exploded as regards these and other Colonies of the Empire, with respect not only to Queen's Counsel, but also to matters of much greater importance.

My advisers observe that it is incorrect to speak of the Provincial Acts as "divesting" the Crown of its prerogative. These Acts merely provide for the manner of exercising the prerogative in a constitutional way. Appointments of Queen's Counsel by His Excellency the Governor-General are made, not of his own motion, nor at the instance of Her Majesty personally, nor of Her Majesty's Imperial advisers; they are made on the advice and at the instance of His Excellency's Canadian advisers; and appointments by the Lieutenant-Governor since Confederation have been of precisely the same character. The question at issue is not between Her Majesty and the Provinces, nor between Her Majesty's Ministers in England and the Provinces, nor between the Governor-General personally and the Provinces. On the contrary, the question is entirely between the local advisers of the Governor-General on the one hand, and the Local advisers of the Lieutenant-Governors on the other; or in other words between the Federal Government and the Provincial Governments. Accordingly, in the report of the Minister of Justice of 29th September, 1872, and the Order-in-Council made thereon, the Commissions are expressly stated to be issued by the "Government" of Canada. It is plain that the Sovereign personally has not for a purpose of this kind, and cannot have, the necessary knowledge of the Bar of even the United Kingdom, and still less of the Bar of the Colonies. Appointments of Queen's Counsel in the United Kingdom are made in the Queen's name, on the advice and at the instance of Ministers responsible to the representatives of the people in the British Parliament. In this country they are made in the Queen's name, by Federal or Provincial Ministers responsible to the Federal Parliament or to the Provincial Legislatures. The Acts in question provide for the appointment of Queen's Counsel for the business of Provincial Courts being made by the Lieutenant-Governor, to whom the Queen, by assenting to the B. N. A. Act, has assigned all other Executive authority in Provincial affairs.

My Government hold that the Provincial Acts in question are authorized in the B. N. A. Act, both by express words, and by words involving such authority by necessary implication; but they also insist that the rule of interpretation as to matters of prerogative is much less stringent than the argument against the Provinces assumes. There are numerous exceptions to the rule. The Crown is said to be "bound by statutes of certain kinds, though it is not named in them." Thus, the Crown is said to be bound, even where it is not named, by all statutes passed with the object of preventing or suppressing wrong or of advancing right; by statutes made for the public good; or for the advancement of religion and justice. The Crown is bound by the general provisions of the Magna Charta; by the Act *de donis*; and by various other Acts, without being named. In view of the exceptions, it has been said to be "not easy to discover any method of defining or classifying those Statutes which bind the Crown without express words, and which form

the exceptions to the general rule." My Government do not question that "it is a well-established rule, generally speaking, in the construction of Acts of Parliament, that the King is not included unless there be words to that effect; for it is inferred *prima facie* that the law made by the Crown with the assent of Lords and Commons is made for subjects, and not for the Crown.*" But what they claim is, that this reason does not apply to an Act the express object of which is to grant a Constitution, a Legislature and an Executive, to Colonies of the Empire. My Government insist that all Government and and all Executive authority are matter of prerogative, and that in a sense Legislation is so likewise, for the Royal assent is necessary to Legislation. In the case therefore of a Constitutional Act there is no presumption that general provisions contained in it were not intended to include any matter of prerogative which, in the absence of the rule of interpretation referred to, would be covered by the general words emyloyed. My Government inform me that they are not aware of any judicial authority for applying the rule, and they claim that it is not applicable, to an Act, by which, "Her Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in Parliament assembled," grants to one of Her Colonies a Constitution for regulating its own affairs in legislation and government. Such a Constitution cannot be created without dealing with prerogative. The B. N. A. Act from beginning to end deals with matters of prerogative, and mostly without any express naming of the Queen.

My Government claim that the anti-Provincial view overlooks the nature and principle of government and legislation. A Colonial Legislature when acting within the limits prescribed by Imperial authority "has and is intended to have plenary powers of legislation as large, and of the same nature, as those of Parliament itself," and when a question arises whether the prescribed limits have been exceeded, the only way in which that question can be determined "is by looking at the terms of the instrument by which affirmatively, the legislative powers were created, and by which negatively, they are restrained. If what has been done is legislation within the general scope of the affirmative words which give the power, and if it violates no express condition or restriction, by which that power is limited, it is not for any Court of Justice to enquire further, or to enlarge constructively those conditions and restrictions."† It has never been suggested, in maintaining the anti-Provincial view of the present question, that the Provincial Acts violate any "express condition or restriction by which" the Provincial powers are limited; and on the other hand I am advised that these Acts are beyond controversy "within the general scope of affirmative words which give" those powers.

These considerations appear to my Government to destroy the foundation on which the anti-provincial argument rests, and to constitute a conclusive answer to that argument.

Another answer to the anti-Provincial view is, that the B. N. A. Act plainly intended to confer on the Governments and Legislatures thereby provided for, all the powers which the Governments and Legislatures of the Provinces possessed before being confederated (unless certain restrictions imposed on the Dominion Parliament for the protection of the Provinces *inter se* should be considered as exceptions). The purpose of

*Wilderforce's Statute Law 37, 40, *et seq.*; 1 Black Com. 262 Bowyer, 167, etc.

†Queen v. Burah, 3 App., 904.

the Act was to extend, and not to limit, the powers of the people of Canada in Legislation and Government. These powers are distributed by the Act between the Government and Parliament of the Dominion on the one hand, and the Governments and Legislatures of the Provinces on the other, the powers of the Dominion Parliament being expressly limited to subjects not assigned to the Provincial Legislatures. The Governments of the Provinces before Confederation possessed and exercised the power of appointing Queen's Counsel; it is not pretended that this subject falls within any of the enumerated classes of Federal jurisdiction; and it certainly does fall within the general terms of several classes of subjects assigned to the Provincial Legislatures. The result seems to my Government to be inevitable, that, so far as regards matters of Provincial jurisdiction, the power of providing by Statutes for Queen's Counsel belongs to the Provincial Legislatures.

I am advised that the authority of a Provincial Legislature to pass such Acts as those in question is to be found in no fewer than four of the Articles enumerated in Section 92 as belonging to Provincial Legislatures, viz, Articles 4, 13, 14, 16.

Of these the 4th Article gives to Provincial Legislatures exclusive jurisdiction to make laws respecting "the establishment and tenure of Provincial Offices, and the appointment and payment of Provincial Officers." In maintaining the anti-Provincial view of the present question, the fact has been overlooked that the appointment of all officers, and not of Queen's Counsel only, is matter of prerogative. The Dominion Government can have no right to say what members of the Bar shall be Queen's Counsel in Provincial business with which that Government has nothing to do; and it is therefore admitted that the Lieutenant-Governor in Council has the right of selecting from the Bar such members of it as he may think fit for the actual conduct of such Crown business as belongs to Provincial jurisdiction.

The office of Queen's Counsel is said to be one of honour; but I am advised that in the books of authority it is expressly said that it is not an office of honour only; it gives an important privilege, viz., pre-audience in the Courts, etc. The Sovereign is in law the fountain, not of honour only, but of office also. "The King is the fountain of honour, office and privilege.... From the same principle" as the prerogative in regard to honours, "arises the prerogative of erecting and disposing of offices; for honours and offices are in their nature convertible and synonymous. All offices under the Crown carry in the eye of the law an honour along with them, because they imply a superiority of parts and abilities, being supposed to be always filled with those that are most able to execute them, and on the other hand all honours in their original had duties or offices annexed to them,*"

My Government claim that to construe the 4th Article as excluding any one class of Provincial Officers, on the ground of prerogative, is to adopt an utterly unwarranted construction. The office of Queen's Counsel is the only office which is said to be excluded. The jurisdiction of the Province in regard to all other Provincial Offices—whether connected with the Civil Government of the Province or the Administration of Justice, and whether since Confederation there has been any Provincial legislation regarding such offices or not—has never been questioned on the ground of prerogative or any other ground. Many of these offices are more important than the office of Queen's Counsel.

* 1 Blackstone's Com. 271, *et seq.*, etc.

Amongst the offices in Ontario conceded to belong to Provincial jurisdiction, are the offices of the Masters of the Courts, the Registrars and Clerks of the Crown, Sheriffs, Police and Stipendiary Magistrates, Justices of the Peace, Coroners, County Crown Attorneys, Registrars of Deeds, etc.

I am not aware that it has been said to be inaccurate to speak of the "office" of Queen's Counsel, or to speak of Queen's Counsel as "officers." There is certainly no ground on which such an assertion could be made. The Statute, 6 Anne, c. 7, s. 24, provided that if any member "shall accept of any office of profit from the Crown during such time as he shall continue a member, his election shall be and is hereby declared void;" and under this Statute an appointment as Queen's Counsel was repeatedly held to be an "office."

The Provincial right under the 4th Article seems to my Government to be perfectly clear and unanswerable, without the aid of any other Article; but they maintain that other Articles and provisions of the Act establish the same conclusion.

Of these I have mentioned Article 13. By that Article Provincial Legislatures have jurisdiction to make laws in relation to "property and civil rights within the province." The right to plead in the Courts, and the right of pre-audience there, are certainly civil rights. The words "property and civil rights" are those chosen by the British Parliament in 14 Geo. 3, c. 83, sec. 8, as the most extensive possible: "In all matters of controversy relating to property and civil rights, resort shall be had to the laws of Canada as the rule for the decision of the same." Under the same words in the Upper Canada Act, 33. Geo. 3, chap. 1, the whole law of England, except the Criminal Law (which was the subject of another enactment), was held to be introduced; and no distinction has been drawn between laws limiting the prerogative and any others.

It has been said that several of the Articles which are enumerated in sec. 91 as belonging to Federal jurisdiction, necessarily interfere more or less with civil rights; but in the present case it has never been suggested that any Article in that section gives to the Federal Parliament jurisdiction in this matter. There being therefore no clashing between the Article as to civil rights and any Article of Federal jurisdiction, there is no reason why, as respects the present question, this Article should not receive its full significance.

The 14th Article of Provincial jurisdiction is also referred to. It gives to the Provinces exclusive jurisdiction to make laws in relation to the "Administration of Justice of the Province, including the constitution, maintenance, and organization of Provincial Courts both of civil and criminal jurisdiction." Now, I am advised that the whole subject of the Administration of Justice and of the creation of Courts is (like the appointment of Officers) matter of Royal Prerogative. "The Prerogative of creating Courts and offices has been immemorially exercised by the Kings of England, and is founded on the capacities of Executive Magistrate and distributor of justice which the constitution of the country has assigned to the sovereign."* The King "has alone the right of erecting Courts of Judicature; for though the constitution of the kingdom has entrusted him with the whole executive power of the laws, it is impossible as well as

* Chitty on Prerogative, 75.

improper that he should personally carry into execution this great and extensive trust. It is consequently necessary that Courts should be erected, to assist him in executing this power; and equally necessary that, if erected, they should be erected by his authority. And hence it is, that all jurisdiction of Courts are either mediately or immediately derived from the Crown, their proceedings are generally in the King's Name, they pass under his seal, and are executed by his officers." *

The appointment of Queen's Counsel is immeasurably less important than the prerogative rights which the 14th article undeniably gives to the Provincial Legislatures; and is in fact a mere incident of the Royal jurisdiction in the Administration of Justice. Where the latter subject is given generally, there can be no presumption that this minor and incidental prerogative of appointing Queen's Counsel was withheld; the greater power must be taken to include and carry with it the less.

I am advised that writers on Constitutional Law deal with the subject of Queen's Counsel under the heads of "Courts," the "judicial power and jurisdiction," "judicial offices," and the like. The subject is treated of by Sir William Blackstone in the chapter entitled, "Of Courts in General." The learned author speaks *inter alia* of Attorneys, Barristers and Serjeants, etc.; and, referring to Barristers and Serjeants, he says: "From both these degrees some are usually selected to be Her Majesty's Counsel learned in the law, the principal of whom are called her Attorney and Solicitor-General." In Bowyer on Constitutional Law, the subject of Queen's Counsel is treated in the chapter on "The Judicial Power in General;" and in Cox on the Institutions of the English Government, in the chapter on "Judicial Offices."

I am referred also to the 16th article, which gives to the Provincial Legislatures jurisdiction generally in all matters "of a purely local or private nature in the Province." The appointments in question relate to matters of a merely local nature.

Besides these four articles under which the appointment of Queen's Counsel legitimately falls, I am advised that various other of the Articles assigned to Provincial jurisdiction involve matters of prerogative, though the Queen is not mentioned; and that these Articles therefore afford further illustrations of the position, that matters of prerogative were intended to be dealt with throughout the Act.

Thus, by virtue of her prerogative the property of the State is vested in Her Majesty; but by the B. N. A. Act all the Crown Lands in each Province, and all mines, minerals, and royalties, are to belong to the Province; and laws as to the management and sale of the public lands, and the timber and wood thereon, are specially assigned by the 5th Article to Provincial jurisdiction. So, Public Prisons are at Common Law the property of the Sovereign, and the Sovereign is their Governor; † but the establishment, maintenance and management of Public and Reformatory Prisons are expressly assigned to the exclusive jurisdiction of the Provinces. Again, the prerogative of the Crown to institute corporations is undoubted; ‡ and yet the incorporation of all companies with Provincial objects is assigned to Provincial jurisdiction.

* 1 Blackstone's Com., 267. † Chitty on Prerogative, 103.
‡ Chitty on Prerogative, 122. B. N. A. Act, Sec. 92, 109.

Section 129 may also be referred to for the same purpose. This section provides that, "except as otherwise provided by this Act, all laws in force in Canada, Nova Scotia, or New Brunswick, at the Union, and all courts of civil and criminal jurisdiction, and all legal commissions, powers and authorities, and all officers, judicial, administrative and ministerial, existing therein at the Union, shall continue in Ontario, Quebec, Nova Scotia, and New Brunswick, respectively, as if the Union had not been made, subject nevertheless (except with respect to such as are enacted by or exist under Acts of the Parliament of Great Britain, or of the Parliament of the United Kingdom of Great Britain and Ireland) to be repealed, abolished, or altered by the Parliament of Canada, or by the Legislature of the respective Provinces, according to the authority of the Parliament or of that Legislature under this Act." This section obviously embraces matters of prerogative as well as other matters. It is by the Crown, through its ministers, that "Commissions" are issued, and that "Officers, judicial, administrative and ministerial," are appointed. I have already observed that the establishment of Courts, also, is a matter of prerogative. The whole section shews that the laws which were to continue in force included those relating to the Crown as well as other laws; and the section provides in regard to all without exception, that they may be "repealed, abolished or altered" by the Parliament of Canada or by a Provincial Legislature, according to the authority belonging to the one or the other under the Act.

It is thus manifest that the whole scope of the Act is opposed to the exclusion of matters of prerogative from Provincial jurisdiction, and to the notion that any prerogative right fairly falling within the general language employed is not to be included.

I am also advised that the powers given to Colonial Legislatures have from the earliest times been expressed in general terms, and have never been assumed on that account to exclude matters of prerogative. The provision formerly contained in the Commissions of Instructions to Governors and Lieutenant-Governors appointed in England, that all Bills involving the prerogative should be reserved, is itself a standing proof of the view that, if assented to under the constitution of the colony, such Bills, though involving matter of prerogative, would be valid and binding laws. My Government maintain that the doctrine on which the validity of the Provincial Acts in question is denied, is in opposition to the practice under (so far as known) all the Constitutions of all the Colonies of the Empire; and that on such a point this practice is absolutely conclusive as to the proper interpretation in this respect of the general powers of the Provincial Legislatures under the B. N. A. Act.

To maintain the validity of the Commissions issued to Queen's Counsel by the Lieutenant-Governor of this Province since Confederation, nothing more is needed than the authority of the Provincial Acts which I have mentioned; but my Government insist further, that the Lieutenant-Governor *virtute officii*, and without such legislation, had authority to make such appointments. No opinion on this point was expressed by the Novia Scotia Judges; the opinion on it of the English Law Officers was formed on an *ex parte* Case which omitted all mention of the grounds that sustain the right of the Lieutenant-Governor; and in the Dominion Supreme Court the point was understood to be conceded at the Bar.

The position of my Government is, that the Lieutenant-Governor is entitled *virtute officii*, and without express statutory enactment, to exercise all prerogatives incident to Executive authority in matters over which Provincial Legislatures have jurisdiction; as the Governor-General is entitled *virtute officii* and without any statutory enactment, to exercise all prerogatives incident to Executive authority in matters within the jurisdiction of the Federal Parliament: that a Lieutenant-Governor has the administration of the Royal Prerogatives as far as they are capable of being exercised in relation to the Government of the Province, as the Governor-General has the administration of them, so far as they are capable of being exercised in relation to the Government assigned to the Dominion.

The B. N. A. Act does not expressly define all the powers either of the Governor-General or of the Lieutenant-Governor. It is presumed that as a matter of law the Crown might delegate to either of these Officers any of the powers of the Crown for which express provision is not made by the B. N. A. Act, or by authorized Dominion or Provincial legislation. But in the absence of any such express delegation or legislation, my Government insist that the Governor-General and Lieutenant Governors have respectively under their Commissions, all powers incident to their respective offices, all powers necessary and proper for the administration of their respective governments, all powers usually given to or exercised by Colonial Governors.

The argument by which my Government maintain this position may be briefly stated:—

My Ministers affirm the intention of the B. N. A. Act to have been, beyond all doubt or question, that Provincial Governments should have the Executive duty and authority generally which may be incident to matters falling within the Legislative jurisdiction of the Provinces. They assert this to have been the undoubted and unquestioned understanding on which the subject of Confederation was considered, on which the resolutions which formed the basis of the B. N. A. Act were framed and accepted, and was the understanding which, without any express provision to this effect in the Act, has been acted upon as of course by the Dominion and Provincial authorities ever since confederation; and it may be observed here, that the work of Administration incident to the subjects of Legislative authority has involved large annual expenditure by every Province. The whole prerogative subjects of the Administration of Justice and enforcement of the laws, have ever since Confederation been left to the Executive of the Provinces; and in all the Provinces Executive authority has been exercised, and justice has been administered, in the Queen's name, since Confederation as before. The Sovereign has been regarded as still, constitutionally, the Supreme Executive Magistrate, a party to all Legislation, and the Administrator of the laws, as the Sovereign was before Confederation. But her Majesty's prerogatives in all these respects are exercised in Provincial matters, as in Federal and Imperial matters, through Constitutional Advisers, Ministers, Judges and other officers. As before Confederation, all Provincial Proclamations are in Her name; all grants of Provincial lands and property; all suits on behalf of the Province in cases in which by the Constitution and practice of England and of the Provinces before Confederation this would have been their form; all Commissions to judicial and administrative offices includ-

ing Masters, Stipendiary Magistrates, Police Magistrates, Justices of the Peace, Coroners, Sheriffs, Registrars, and Crown Attorneys. The power of a Province to make these appointments may as well be denied as the power of appointing Provincial Queen's Counsel. They are all matters of prerogative. In a word, wherever before Confederation the Queen's name was used in regard to any matter now belonging to Provincial jurisdiction, it has ever since been used in all the Provinces. Hardly a day passes in which the Lieutenant-Governor does not exercise, or in which there is not exercised in his name, one or other of the Royal prerogatives having reference to Provincial matters. Provincial Government could not be carried on without this being done; and the propriety of this mode of exercising Executive powers, performing Executive functions, and carrying on proceedings generally, has ever since Confederation been assumed to be the proper and necessary course by the Dominion and Provincial Governments, the Courts, the legal profession and the public.

This practical exposition of the Act by those who respectively had to do with the negotiations, the discussions, the framing of the Act the procuring of it and since with the working of it, should not and cannot be open to question now.

If the question were now open, and had to be considered without the light of what has taken place, my Government insist, that looking at the whole scope of the Act, the propriety of the practical interpretation which it has received appears clearly from reasons which I shall now state.

Each Province as well as the Dominion has by the B. N. A. Act a Great Seal, which is declared to be the Emblem of Sovereignty.

Again: the 9th section of the Act is as follows: "The Executive Government and authority of and over Canada is hereby declared to continue and be vested in the Queen." No class of matters to which Her Majesty's authority had before extended is excepted. My advisers are aware that this declaratory enactment has been said to have by implication the effect of excluding the Queen from the jurisdiction which she had previously possessed in regard to matters assigned by the Act to the Provinces; but my Government say that this construction not only disregards, but reverses, the maxim on the application of which the whole argument for the anti-provincial view is built; and they also deny the alleged implication, and hold the suggested construction to be unsupported by either authority or reason. They insist that this section, on all accepted principles of interpretation, is as applicable to matters of Provincial as to matters of Federal jurisdiction; and that the Provincial construction of the section is in accordance with the general doctrine, that the Sovereign is "not only the chief, but properly the sole magistrate of the nation; all others acting by commission from and in due subordination to him." My Government maintain that a Lieutenant-Governor acts by Commission from Her Majesty when he acts by Commission issued in Her name under the authority of an Imperial Statute to which Her Majesty is a party.

The Executive Government, distributed by the Act between the Federal and Provincial authorities, requires for its exercise both a Governor-General and Lieutenant-Governors. The Act does not provide the manner of appointing the Governor-General no provision for that purpose being needed; Her Majesty could appoint the Governor-

General without statutory authority, on the advice of Her Ministers in England. But it was intended that for the future the Lieutenant-Governors should be appointed directly by the Governor-General, acting under the advice of the "Queen's Privy Council in Canada;" this required Statutory enactment; and accordingly, under the heading "Provincial Constitutions—Executive Power," the Act provides that, for each Province "there shall be an officer styled the Lieutenant-Governor." The Act also contains the expressions: "Government of the Provinces," "the Executive Government" of a Province, and "Executive authority" therein; and the "provisions of the Act referring to the Lieutenant-Governor" are declared to "extend and apply to the Lieutenant-Governor for the time being of each Province, or other the Chief Executive Officer or Administrator for the time being carrying on the Government of the Province."

My advisers point out that, as it is a principle in British Constitutional law that all Government and all Executive authority are matters of prerogative, the lawful appointment of a Governor or Lieutenant-Governor carries with it by implication the rights incident to such an office, or usually belonging to it. On this subject, I am referred to a judgment of the Privy Council containing the following passage: "Implied powers may be given to an office as incident, either because they are necessary to its due execution, or because they are such as have been usually exercised by those who have borne it."*

So, in some of the old proprietary colonies the Governors or Lieutenant-Governors were, under the Royal Charters, appointed by the proprietors. They were not appointed by the Crown in Virginia, Massachusetts, Connecticut, Rhode Island, Maryland, the Carolinas, or Pennsylvania. In all these colonies, therefore, the Governors or Lieutenant-Governors, though appointed, not by the Sovereign, but by the proprietors, were constitutionally the King's representatives. I am further informed that in "Chitty on Prerogative" it is said that the form of government in most of the chartered governments "is borrowed from that of England. They have a Governor named by the King (or in some proprietary colonies by the proprietor) who is his representative or his deputy." There is thus no distinction made in this respect between Governors named by the King and Governors named by colonial proprietors. *A fortiori* must this character of being the Queen's representative in Provincial matters apply to a Lieutenant-Governor appointed under Imperial Statute by a Governor-General, the Queen's representative for this purpose, appointed by Her Majesty, and acting by the advice of "the Queen's Privy Council for Canada."

My Government hold, that, in matters of Provincial jurisdiction, the Lieutenant-Governor represents the Queen as regards matters of prerogative and otherwise, as certainly as Her Majesty is represented by the Governor-General when acting within the scope of his powers. Both the appointment of the Governor-General and that of the Lieutenant-Governor are made by Commissions in the Queen's name; and the special provisions of the Act in regard to the two Officers closely correspond. The Lieutenant-Governor is to take the same oaths as the Governor-General. Like the Governor-General, he is to have an advisory Council composed of such persons as he sees fit. He is to

* Cameron v. Kyte, 3 Knapp, 345, 346.

call the Provincial Legislature together in the Queen's name by an instrument under the Great Seal of the Province, as the Governor-General is to call the Federal Parliament in the Queen's name and under the Great Seal of the Dominion. If Legislative Councillors are to be appointed in a Province, the Lieutenant-Governor is to appoint them in the Queen's name, as the Governor-General appoints Senators. The Constitution of the Executive authority in Nova Scotia and New Brunswick was to continue until altered under the authority of the Act, and under this Constitution the Lieutenant-Governor was wont to call together the Assembly in the Queen's name, to appoint Legislative Councillors in her name, and generally in her name to carry on the whole business of government. I have already mentioned that all powers, authorities and functions previously given by statute to the former Governors or Lieutenant-Governors are expressly vested in the Governor-General so far as the same relate to the Federal Government, and in the Lieutenant-Governors so far as the same relate to the Provincial Governments.

The Acts of the Ontario Legislature ever since Confederation, like the Acts of most of the other Provinces of the Dominion and of the Empire, have always been in the name of the Queen. I am informed that in a recent case, * Lord Cairns, in delivering the judgment of their Lordships of the Judicial Committee of the Privy Council, expressly referred to the subject, observing as to the Act of the Province of Quebec there in question, that it was "an Act which had been assented to on the part of the Crown, and to which the Crown therefore is a party." The assent by the Lieutenant-Governor and the acquiescence in the Act by the Governor-General were treated as an assent by the Crown. In that case an intention that there should be no appeal to Her Majesty in Council as to the matter in question was held sufficiently shown, though the Crown or prerogative was not mentioned in connection with the provision, their lordships being of opinion (in effect) that such was the intention and was the fair construction of the Act.

Further: Both the Imperial and Federal Governments have recognized the possession by the Lieutenant-Governor of implied powers in matters of prerogative, where the implication was less "necessary" than in the case under discussion. In 1876, the then Minister of Justice, representing in this matter the Dominion Government of that time, thought that the Lieutenant-Governor so clearly had, expressly or impliedly, all the prerogative powers incident to the administration of Provincial affairs, that it was objectionable to continue in the Commissions to the Governors-General the clause, which such Commissions had theretofore contained, purporting to give to the Lieutenant-Governors the power of proroguing and dissolving Provincial Legislatures. So also, before Confederation, Commissions to the Governors-General of Canada had contained a clause purporting to give them powers with respect to marriage licenses, letters of administration, probates of wills, and the custody and management of lunatics and idiots and their estates, the last of these subjects being matter of undoubted prerogative, and all of them having theretofore been so regarded in Colonial affairs. It was pointed out by the Minister of Justice that the subjects so mentioned were within the exclusive

* Theberge vs. Landry 2 App. Cas. p. 102.

control of the several Provinces, and were dealt with under local legislation, the Governor-General and his advisers having (as he said) no concern with such matters. He in consequence suggested, not that future Commissions should give these powers to the Lieutenant-Governors, but that the clause should be wholly omitted. A Lieutenant-Governor's power in regard to these prerogative matters was thus assumed to be implied as belonging to him *virtute officii* under the B. N. A. Act and his Commission. These suggestions on behalf of the Federal Government were acquiesced in by Her Majesty's Government in England, and the clauses so objected to have been omitted from the Commissions since issued.

The opinions expressed in the case before the Supreme Court form the only known ground for the anti-Provincial view. It should be remembered, in connection with the other considerations presented in this despatch, that the subject in some of its most important aspects was new to the Court; and hence, in the absence of argument for the Provincial view, one of the three learned judges said that he had not "been able to suggest to himself the arguments by which such an opinion [an opinion that the Provincial Acts were valid] could be supported." Another had to treat the 14th Article of Section 92 (the article mentioned in the report of the Minister in 1872) as the only one on which an argument, however feeble, could proceed; and a third was led from the same cause to say, that "there is not a single clause, a single word of the B. N. A. Act upon which it can seriously be contended that the Lieutenant-Governors are vested with Her Majesty's prerogative rights of conferring such honors and dignities;" that "nowhere in the Act can a single expression be found to sustain the contention that a Lieutenant-Governor has such a power;" and that "the creation and appointment of Queen's Counsel has never been considered as a part of the administration of justice." My Government gladly recognize the great ability and general accuracy of all three judges; but it would be manifestly most unjust to them, as well as to the Provinces, that they should be held to be bound by opinions formed under all the disadvantages which these observations illustrate. Those opinions cannot be acquiesced in by the Provinces without accepting an interpretation of the B. N. A. Act which would go far to deprive them of the whole Executive authority which it was intended they should possess, and which they have hitherto exercised.

My Government claim for the Lieutenant-Governor, both under the Provincial Statutes on this subject, and independently of them, the power of selecting Queen's Counsel *eo nomine* from the Bar of the Province, with the rights incident to the office of Queen's Counsel; and they claim for the Lieutenant-Governor in like manner the power of determining the right of pre-audience amongst the members of the Provincial Bar in all Courts and matters over which the Provincial Legislatures have jurisdiction.

I have the honour to request that, in case there is transmitted to England any list of Queen's Counsel which omits the names of Queen's Counsel holding Provincial Commissions only, or any document questioning their status, one of the accompanying printed copies of this despatch be also transmitted for the information of the Right Honourable the Secretary of State for the Colonies, and of their Lordships of the Judicial Committee

of the Privy Council; and that a copy of the other documents transmitted to England be sent to me for the information of my Government.

I have, etc.,

(Signed) JOHN BEVERLEY ROBINSON,
Lieutenant-Governor of Ontario.

To the Honourable
THE SECRETARY OF STATE,
Ottawa.

Enclosure with above.]

LIST OF QUEEN'S COUNSEL AT TIME OF CONFEDERATION, OMITTING THOSE WHO HAVE SINCE DIED OR BEEN APPOINTED JUDGES.

Sir J. A. Macdonald,
Oliver Mowat,
Miles O'Reilly,
Hon. Alexander Campbell,
Hon. Stephen Richards,
David B. Read,
James Patton,
Sidney Smith,
John Bell,*
John Hector,
A. N. Richards,
Æmilius Irving,
Christopher Robinson
Edward Blake,
Clarke Gamble,
Philip Low,
Richard Miller,
Richard W. Scott,*
Daniel McMichael,†
R. S. Woods,
James A. Henderson,
Alexander Leith,
Thomas Robertson,
John O'Connor,
Hector Cameron,
James Beaty.

LIST OF QUEEN'S COUNSEL FOR THE PROVINCE OF ONTARIO, WHO HAVE PROVINCIAL COMMISSIONS AND HAVE NOT RECEIVED DOMINION COMMISSIONS.

Timothy Blair Pardoe
Arthur Sturgis Hardy,
Francis R. Ball,
David Glass,
Christopher Finlay Fraser,
John Galloway Scott,
Donald B. Maclennan,
William Kerr,
Robert Lees,
Malcolm Colin Cameron.

[6. THE LIEUTENANT-GOVERNOR TO THE SECRETARY OF STATE.]

GOVERNMENT HOUSE,

TORONTO, 23rd January, 1886.

SIR,—I have the honour to inform you that my Despatch of yesterday being necessarily of considerable length, and the subject being the important one of the Executive powers of the Lieutenant-Governors of the Provinces, it was deemed desirable to print

NOTE.—*The name of Mr. Bell should be placed after Mr. Scott.

†It has since been ascertained that Mr. McMichael and the gentlemen whose names follow his, were not ppointed until after Confederation.

it for more convenient reading and reference, as well as in order to provide accurate copies for immediate transmission to England in case there should be the occasion for transmission suggested in the last paragraph of the Despatch. I have directed five printed copies to be sent to you herewith.

I have, etc.,

(Signed) JOHN BEVERLEY ROBINSON,
Lieutenant-Governor of Ontario.

The Honourable
The Secretary of State,
Ottawa.

[7. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State,
Ottawa, February 3rd, 1886.

Sir,—With reference to previous correspondence upon the subject, I have now the honour to acknowledge the receipt of your despatch of the 22nd ultimo, and of the enclosures therein named, relative to the appointments of Queen's Counsel, and to state that the matter will receive consideration.

I have, etc.

(Signed) G. POWELL,
Under Secretary of State.

His Honour
The Lieutenant-Governor of Ontario,
Toronto.

[8. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State,
Ottawa, 3rd February, 1886,

Sir,—I have the honour to acknowledge the receipt of your Despatch of the 23rd ultimo, transmitting printed copies of your despatch of the previous day, relative to the appointment of a Queen's Counsel, and to state that the matter will receive consideration.

I have, etc.,

(Signed) G. POWELL,
Under Secretary of State.

His Honour
The Lieutenant-Governor of Ontario,
Toronto.

[9. The Lieutenant-Governor to the Secretary of State.]

Government House,
Toronto, 29th May 1886.

Sir,—Adverting to previous correspondence upon the subject, I have now the honour to request you to state the action the Dominion Government intend to take, or has taken, in the matter of Provincial Queen's Counsel mentioned in my Despatch of the 22nd Jannary last.

I have, etc.,
(Signed) J. B. ROBINSON,
Lieutenant-Governor of Ontario.

The Honourable
The Secretary of State, Ottawa,
Ontario.

[10. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State,
Ottawa, 7th June, 1886.

Sir,—I have the honour to acknowledge the receipt of your Despatch, No. 2738, requesting to be informed the action of the Dominion Government intend to take, or has taken, in the matter of Provincial Queen's Counsel mentioned in your Despatch of the 22nd January last.

I have, etc.,
(Signed) G. POWELL.
Under Secretary of State.

His Honour
The Lieutenant-Governor of Ontario,
Toronto.

[11. The Secretary of State to the Lieutenant-Governor.]

Department of the Secretary of State.
Ottawa, 27th September, 1886.

Sir,—I have the honour to acquaint you, for the information of your Government that His Excellency the Administrator of the Government has had under his consideration in Council your despatch of the 22nd January last, on the subject of the appointment of Queen's Counsel and containing the views of your Government respecting the power of a Lieutenant-Governor to appoint Queen's Counsel, the argument being mainly directed against the judgment of the Supreme Court of Canada in Lenoir *v.* Ritchie (3 Can. S. C. R. 571, 1 Cart. 488). I have now to state that His Excellency is advised respecting the several grounds of contention brought forward in your despatch as follows:

1. With respect to the objection that no Province, except Nova Scotia and no Queen's Counsel, except Queen's Counsel for that Province, were represented in the argument of the case above mentioned, it must be remembered that the case was argued in January,

and the considered judgment of the court was not rendered until the November following. It is equally true that the Government of Canada was not represented in the argument. It must happen that the validity of Acts of Parliament and of the Legislatures of the Provinces will constantly be in question in the ordinary litigation between private persons, and it is, His Excellency is advised, neither convenient nor necessary for the Government of Canada, and of the Provinces to intervene and become parties to such litigation in all cases in which such questions arise. It is open to them to adopt such a course if they see fit, but it is not the practice even in cases for some special reason. With reference to the propriety of referring such questions to the Supreme Court or to the Privy Council, His Excellency's advisers, while not thinking that such questions should never be presented in that manner, are of the opinion expressed by the Minister of Justice in 1876, that some inconvenience may be expected to arise therefrom and that the more correct mode of obtaining the decision of the Court, is by appeal in the ordinary way. The case of Lenoir *v.* Ritchie was one which when before the Courts attracted considerable attention, and there can be little doubt that your Honour's Government could, if they so desired, have taken steps to have their views presented to the Supreme Court of Canada. It cannot be admitted, however, that because they did not do so, they are not therefore in the administration of public affairs, bound to respect the decision of the Court in the same manner as the Government of Canada is bound, though also unrepresented at the argument of the case, to respect the decision until it is overruled by competent authority.

2. With reference to the statement that the opinion expressed in that case, that the Act of Nova Scotia authorizing the Lieutenant-Governor to appoint Queen's Counsel was *ultra vires*, was the opinion of three only of the six judges, it is necessary in order to avoid misapprehension, to observe that while it is true that the Supreme Court consists of six judges, it is not a fact that the Court on the hearing of the case in question was composed of six judges, but of five only, the Chief Justice Sir William Ritchie taking no part in the case on the ground, it is assumed (though not so stated in the case), of his relationship to the Respondent.

In view of the fact that the three of the five judges who held the Act referred to invalid, gave their reasons at length with at least equal facilities as your Honour's advisers for arriving at a sound conclusion, His Excellency observes that the statement that it would be manifestly most unjust to such judges to hold them bound by the opinion formed by them is a statement which cannot be accepted.

3. Your Honour's Government in the main, base their contention of the validity of the Act of the Legislature vesting in the Lieutenant-Governor, power to appoint Queen's Counsel on the following articles of the 92nd Section of the British North America Act.

"4. The establishment and tenure of Provincial officers and the appointment of Provincial officers.

"13. Property and civil rights in the provinces.

"14. The Administration of Justice in the Province, including the constituted maintenance and organization of Provincial Courts both of civil and criminal jurisdiction, and including procedure in civil matters in those courts.

"16. Generally, all matters of a merely local or private nature in the Province."

The 14th Article, His Excellency is advised, is fully discussed by each of the three judges referred to, and as to the fourth they appear to have agreed that Queen's Counsel in the proper sense of the term, were not Provincial officers, though Mr. Justice Taschereau is the only one of the three who specially refers to that view of the case. With reference to the application of Articles 13 and 16, His Excellency is advised that the authority of the decision is not lessened by the fact that it did not on the hearing of the case occur to Counsel to argue or to the judges in giving judgment, to discuss the proposition that the exercise of the Crown's prerogative of appointing Queen's Counsel was either a matter of property or civil rights in the Province, or one of a merely local or private nature therein. Although, as is evident from the despatch under consideration, your Honour's advisers are of opinion that the Acts authorizing the Lieutenant-Governors to appoint Qeeen's Counsel, are beyond controversy within the general scope of the affirmative words of the 92nd Section of the British North America Act, that a construction of the fourth article of that section which excludes the power to appoint such Counsel, is an utterly unwarranted construction, and that the Provincial right thereunder is perfectly clear and unanswerable. His Excellency is advised that so long as the judgment in Lenoir *v.* Ritchie is not revised, it is the duty of Governments and individuals in Canada to respect and conform to that judgment. No inconvenience has been occasioned by the judgment, nor has anything occurred since it was rendered, so far as His Excellency's advisers are aware, which renders it necessary or desirable for His Excellency after the lapse of seven years to facilitate a review of such judgment by a reference of the question involved to the Lords of the Judicial Committee of Her Majesty's Privy Council, and finally the question being settled so far as the Supreme Court of Canada can settle it, His Excellency is advised that it is not necessary to discuss anew the grounds on which the decision of the Court rests.

I have, etc.,

(Signed) THOS. WHITE,

For the Secretary of State.

His Honour

The Lieutenant-Governor of Ontario,

Toronto, Ontario.

[12. Freshfields & Williams to the Attorney-General of Ontario.]

5 Bank Buildings,

London, (E. C.) 14th December, 1887.

Dear Sir,—We beg to enclose a copy of the joint opinion of Sir Horace Davey and Mr. Haldane on the Case prepared by you which we submitted to them in relation to the appointment of Queen's Counsel.

We are, dear Sir,

Yours truly,

(Signed) FRESHFIELDS & WILLIAMS.

The Hon. O. Mowat.

[Copy of Opinion]

1. We feel some doubt as to the power of the Lieutenant-Governor of any Province, other than Ontario, or Quebec to create Queen's Counsel with or without the incidental privilege of pre-audience. But with regard to Ontario and Quebec, we think having regard to Section 134, that the Lieutenant-Governors of the Provinces can create Queen's Counsel for the purposes of the Provincial Courts. Whether the Lieutenant-Governors can regulate the precedence of the members of the Provincial Bars *inter se* is in our opinion one of some difficulty. On the whole, we think not.

2. We are of opinion that the appointment of Queen's Counsel is not a mere dignity or honour, but it is the appointment to an office. We are therefore of opinion that a Provincial Legislature has power to authorize the Lieutenant-Governor to make appointment of Queen's Counsel for the purposes of the Provincial Courts. We rely mainly on the 4th head of Section 92 which, in our opinion, did not receive sufficient attention in the case of Lenoir *v.* Ritchie. We also think that the Legislature can regulate the precedence of the members of the Bars in the Provincial Courts as part of the organization of Provincial Courts and therefore within the 14th head of Section 92. We do not feel pressed by the argument of the judges in Lenoir *v.* Ritchie that such an act would be an interference with the prerogative of the Crown. Assuming that to be so it is a necessary implication from the language of the Act (which would be unmeaning without it) and would therefore bind the Crown. We think that the Ontario Statutes of Chapters 3 and 4 of 1873 are valid.

(Signed) HORACE DAVEY,
" R. B. HALDANE.

Lincoln's Inn, 9th December 1887.

NOTE.—The following is the "Case" upon which the opinion of Sir Horace Davey and Mr. Haldane was given:

[CASE.]

The opinion of Sir Horace Davey and Mr. Haldane is desired on behalf of the Government of Ontario on the following questions which arise under the British North America Act:

1. Has a Lieutenant-Governor of a Province of Canada power *virtute officii* to appoint Queen's Counsel with the incidental privilege of pre-audience in Provincial Courts?

2. Has a Provincial Legislature power to authorize the Lieutenant-Governor to make such appointments? and are the Ontario Statutes, Chapters 3 and 4 of the Session of 1873 valid or invalid? Similar Acts were soon afterwards passed in some (or perhaps all) of the other Provinces.

The history of the question in Ontario, and some reasons in favor of affirmative answers, will be found in the accompanying despatch (printed) of the 22nd January, 1886, from the Lieutenant-Governor to the Secretary of State of Canada.

The history of the question in Nova Scotia is partly stated in the same despatch, and in Lennoir *v.* Ritchie (1 Cartwright, 486; 3 Sup. Court Cases, 571), and some reasons in favor of negative answers, will be found in the judgments in that case, and in the despatch of the Secretary of State to the Lieutenant-Governor of 27th September, 1886, a copy of which is appended to the Lieutenant-Governor's despatch herewith.

RETURN

To a Resolution of the House, passed on the 7th day of February, 1888, That an humble Address be presented to the Lieutenant-Governor, praying that he will cause to be laid before this House a Return of copies of all Orders in Council or other regulations with regard to Timber Dues passed since the first day of January, 1886.

By Command,

ARTHUR S. HARDY,

Secretary.

Provincial Secretary's Office,
Toronto, February 14th, 1888.

Mr. Meredith.

RETURN

TO A RESOLUTION OF THE HOUSE, PASSED ON THE 7TH DAY OF FEBRUARY, 1888, THAT AN HUMBLE ADDRESS BE PRESENTED TO THE LIEUTENANT-GOVERNOR, PRAYING THAT HE WILL CAUSE TO BE LAID BEFORE THIS HOUSE A RETURN OF COPIES OF ALL ORDERS IN COUNCIL OR OTHER REGULATIONS WITH REGARD TO TIMBER DUES PASSED SINCE THE FIRST DAY OF JANUARY, 1886.

The Commissioner of Crown Lands has the honour to report to the Lieutenant-Governor in Council that the Canadian Pacific Railway Company, in order to construct and make permanent its road through North-Westerly Ontario, has found it necessary to cut, during last winter, in that part of the Province lying west of Port Arthur, a quantity of ties and other material.

The lands and timber in that region having been in dispute between the Governments of Canada and Ontario, it has not been felt necessary to fix a tariff of Crown dues upon timber cut there; but as it is now intended the Crown Lands' Department shall collect the duties upon this material, it has become expedient and necessary to fix a rate which shall apply to the cutting in question.

The Commissioner has, therefore, the honour to recommend that he be authorized to charge duty upon the ties at a rate of three cents each, which is the rate charged by the Government of Canada, and upon other material the rates authorized in the District of Thunder Bay.

T. B. PARDEE,
Commissioner.

Department of Crown Lands,
Toronto, 6th May, A.D. 1886.

Copy of an Order in Council approved by His Honour the Lieutenant-Governor the 14th day of May, A.D. 1886.

Upon consideration of the report of the Honourable the Commissioner of Crown Lands, dated 6th May, 1886, the Committee of Council advise that the Commissioner be authorized to charge duty at the rate of three cents each upon a quantity of ties cut by the Canadian Pacific Railway Company in that part of the Province lying west of Port Arthur, being the rate charged by the Government of Canada, and that the Commissioner be also authorized to charge duty upon other material cut by the said Company according to the rates sanctioned in the District of Thunder Bay.

Certified.

J. LONSDALE CAPRÉOL,
Assistant Clerk Executive Council,
Ontario.

The Commissioner of Crown Lands has the honour to report to the Lieutenant-Governor in Council, that it having been reported extensive bush fires had occurred during the past summer in the Thunder Bay District, by which large quantities of pine imber had been injured, steps were at once taken, by sending out Inspectors, to ascertain he actual state of affairs.

The reports which have been received bear out the truth of the statements which had reached the Department. It appears that a considerable area has been run over by forest fires, and a large quantity of pine timber has been so damaged as that, unless it is cut and watered this season, it will be valueless, and the Province sustain a serious loss. The present Crown Timber Regulations do not provide for an emergency of this nature, which must be dealt with instantly and in a special manner. Whilst to survey, advertise and sell by public auction, in the ordinary course, would consume so much time as to render impossible that prompt action which alone can save this timber. Under the circumstances recited it becomes necessary to provide temporary regulations which shall provide for the cutting of the timber this season.

Therefore, the Commissioner respectfully recommends that he be authorized to issue permits for the cutting of this burnt timber to those who may apply for the same, and that the rate of dues to be charged on burnt timber so cut in that district shall for this season be fixed at $1.50 per thousand feet board measure.

T. B. PARDEE,
Commissioner.

Dated 11th November, 1886.

Copy of an Order in Council approved by His Honour the Lieutenant-Governor the 13th day of November, A.D. 1886.

Upon consideration of the report of the Honourable the Commissioner of Crown Lands, dated 11th November, 1886, the Committee of Council advise that the Commissioner be authorized to issue permits to such persons as may apply for them, for the cutting of a large quantity of pine timber in the District of Thunder Bay which has been damaged by bush fires.

The Committee further advise that the Crown dues to be charged on such burnt timber be fixed at one dollar and fifty cents per thousand feet board measure.

Certified.

J. LONSDALE CAPRÉOL,
Assistant Clerk Executive Council,
Ontario.

The Honourable
The Commissioner of Crown Lands.

The Commissioner of Crown Lands has the honour to report, for the information of His Honour the Lieutenant-Governor in Council, that the tariff for Crown dues charged upon timber cut under license in this Province has been in force since the year 1869, or a period of eighteen years.

During this time, owing to the increased demand for building materials and the exhaustion of the Michigan pineries, the value of standing timber has been greatly enhanced.

The other timber-producing Provinces of Canada, notably Quebec and New Brunswick, have increased their tariffs with a view of sharing in the unearned increment of value which has taken place. The ground rent charged in this Province is two dollars per square mile. The rate of dues charged upon square and waney pine timber is one and one-quarter cents per cubic foot, and upon pine saw logs seventy-five cents per thousand feet B.M.

In the Province of Quebec the ground rent has been recently increased, and is now five dollars per square mile, the rate of dues upon square and waney pine timber is two cents per cubic foot, and upon saw logs the rate is equivalent to one dollar and ten cents per thousand feet B. M.

In the Province of New Brunswick the annual ground rent is four dollars per square mile, the dues upon square timber are two cents and a half per cubic foot, and upon pine saw logs one dollar and twenty-five cents per one thousand feet B. M.

In view of the enhanced value of pine timber, which has not been caused by any expenditure of money or exertion on the part of the licensees, the Commissioner is of opinion that the tariff, so far as the products of the pine tree are concerned, ought to be increased, and that the ground rent should also be increased.

The Commissioner has, therefore, the honour to recommend that the tariff upon square and waney pine timber be increased to two cents per cubic foot, and upon pine saw logs to one dollar per thousand feet B. M., and that the ground rent be increased to three dollars per mile per annum, which increases ought to take effect on and after the first of May next, being the commencement of the annual license season of 1887-88.

T. B. PARDEE,
Commissioner.

Department of Crown Lands,
Toronto, 23rd of April, 1887.

RETURN

To an Order of the House dated, 7th February, 1888, for all estimates of expenses of License Commissioners, and in connection with the enforcement of the "Canada Temperance Act," approved by the Provincial Secretary of Ontario for the years 1886-1887 and 1887-1888, including the salary and expenses of Police Magistrates.

By command,

ARTHUR S. HARDY,
Secretary.

Provincial Secretary's Office,
Toronto, 14th February, 1888.

(*Mr. Lees.*)

RETURN

As required by an Order of the Legislature, dated on the 7th day of February, shewing all estimates of expenses of License Commissioners, and in connection with the enforcement of the *Canada Temperance Act*, approved by the Provincial Secretary of Ontario, for the years 1886-87 and 1887-88, including the salary and expenses of Police Magistrates.

No.	License District.	Year.	Estimates approved by the Provincial Secretary.
			$. c.
1	Addington and Frontenac, part	1886-1887	493 80
	" Lennox and Addington, part	" "	706 20
2	Brant, North	" "	1,100 00
3	" South	" "	650 00
4	Brockville and South Leeds	" "	1,090 00
5	Bruce, North	" "	1,125 00
6	" South	" "	1,784 00
7	Cardwell	" "	605 00
8	Carleton	" "	800 00
9	Cornwall	" "	1,100 00
10	Dufferin	" "	1,464 00
11	Dundas	" "	950 00
12	Durham, East	" "	892 50
13	" West	" "	915 00
14	Elgin, East	" "	486 00
	" City of St. Thomas	" "	576 00
15	" West	" "	685 00
16	Frontenac	" "	560 00
17	Glengarry	" "	791 67
18	Halton	" "	1,250 00
19	Huron, East	" "	1,166 67
20	" South	" "	890 00
21	" West	" "	965 00
22	Kent, East	" "	1,540 00
23	" West	" "	1,638 00
24	Lambton, East	" "	1,300 00
25	" West	" "	1,085 00
26	Lanark, North	" "	951 00
27	" South	" "	1,032 00
28	Leeds, North Grenville and South Grenville	" "	1,600 00
29	Lennox	" "	1,000 00
30	Lincoln	" "	880 00
31	Middlesex, North	" "	1,020 00
32	" East	" "	1,300 00
33	" West	" "	1,200 00
34	Monck, Caistor and Gainsboro', Scott Act	" "	150 00
	" Pelham Township, Dunkin Act	" "	75 00
35	Muskoka and Parry Sound, Simcoe District	" "	715 00
	" " " " Victoria District	" "	715 00
36	Norfolk, North	" "	773 00
37	" South	" "	740 00
38	Northumberland, East	" "	920 00
39	" West	" "	1,050 00
40	Ontario, North	" "	1,400 00
41	" South	" "	863 00
42	Oxford, North	" "	969 00
43	" South	" "	950 00
44	Peterboro', East	" "	960 00
	Carried Forward		$45,871 84

ESTIMATES OF EXPENSES OF LICENSE COMMISSIONERS.—*Continued.*

No.	LICENSE DISTRICT.	Year.	Estimates approved by the Provincial Secretary.
			$ c.
	Brought forward		45,871 84
45	Peterboro', West	1886-1887	1,125 00
46	Renfrew, North	" "	1,100 00
	" South	" "	950 00
47	Russell	" "	350 00
48	Simcoe, East	" "	1,135 00
49	" South	" "	1,403 00
50	" West	" "	965 00
51	Stormont	" "	1,225 00
52	Victoria, North	" "	975 00
53	" South	" "	1,430 00
54	Wellington, Centre	" "	1,060 00
55	" West	" "	1,085 00
56	" South	" "	975 00
	" " City of Guelph	" "	1,551 00
	Total		$61,200 84
1	Addington and Frontenac, part	1887-1888	$823 80
	" Lennox and Addington, part	" "	1,576 20
2	Brant, North	" "	1,200 00
3	" South	" "	875 00
4	Brockville and Leeds, Town of Brockville	" "	627 00
	" "	" "	1,404 00
5	Bruce, Centre	" "	1,450 00
6	" North	" "	1,485 42
7	" South	" "	1,751 00
8	Cardwell	" "	730 00
9	Carleton	" "	1,270 00
10	Cornwall	" "	950 00
11	Dufferin	" "	1,900 00
12	Dundas	" "	2,138 75
13	Durham, East	" "	1,020 00
	" " Town of Port Hope	" "	255 00
14	" West	" "	850 00
15	Elgin, East	" "	945 00
16	" West, St. Thomas City	" "	840 00
	" "	" "	760 00
17	Frontenac	" "	1,292 73
18	Glengarry	" "	1,280 00
19	Grenville, Town of Prescott	" "	300 00
	"	" "	1,603 20
	" Town of Prescott, Supplementary	" "	120 00
20	Halton	" "	1,150 00
21	Huron, East	" "	2,072 15
22	" South	" "	1,913 00
23	" West	" "	2,038 96
24	Kent, East	" "	1,310 00
25	" West, Town of Chatham	" "	1,046 96
	" "	" "	520 22
26	Lambton, East	" "	1,195 00
27	" West	" "	1,185 00
28	Lanark, North	" "	1,230 00
29	" South, Town of Perth	" "	775 00
	" "	" "	1,749 90
30	Lennox	" "	1,510 34
	Carried forward		

ESTIMATES OF EXPENSES OF LICENSE COMMISSIONERS.—*Continued.*

No.	License District.	Year.	Estimates approved by the Provincial Secretary.
			$ c.
	Brought forward		
31	Lincoln	1887-1888	1,130 00
32	Middlesex, North	" "	945 00
33	" East	" "	1,970 00
34	" West	" "	1,165 00
35	Monck, Townships Caistor and Gainsboro', Scott Act	" "	210 00
	" Township Pelham, Dunkin Act	" "	105 00
36	Muskoka	" "	1,851 78
37	Norfolk, North	" "	1,218 27
38	" South	" "	1,166 81
39	Northumberland, East	" "	1,441 95
40	" West	" "	800 00
	" " Town of Cobourg	" "	800 00
41	Ontario, North	" "	2,475 45
42	" South	" "	1,290 00
43	Oxford, North	" "	1,209 00
44	" South	" "	995 00
45	Parry Sound	" "	550 00
	" " Town of Parry Sound	" "	100 00
46	Peterboro', East	" "	1,210 00
	" Town of Peterboro'	" "	837 94
	" West	" "	837 93
47	Renfrew, North	" "	1,000 00
48	" South	" "	1,340 00
49	Russell, Townships of Osgood and Gloucester	" "	622 60
50	Simcoe, Centre	" "	1,680 27
51	" East	" "	1,370 00
52	" West	" "	1,110 00
53	Stormont	" "	1,587 28
54	Victoria, East	" "	975 00
55	" West	" "	1,590 00
56	Wellington, South	" "	630 00
	" " City of Guelph	" "	1,032 00
57	" East	" "	1,150 00
58	" West	" "	2,798 00
	Total		$84,337 91

Included in the above estimates for 1886-87, the following sums have been inserted to cover the travelling expenses of Police Magistrates who act without salary.

No.	License District.	Year.	Travelling Expenses.
			$. c.
	Addington Frontenac, part	1886-1887	61 80
	" Lennox and Addington, part	" "	88 20
	Dufferin	" "	100 00
	Durham, East	" "	100 00
	" West	" "	100 00
	Halton	" "	100 00
	Huron, East	" "	66 67
	Kent, East	" "	150 00
	Lambton, East	" "	200 00
	Middlesex, North	" "	100 00
	" West	" "	150 00
	Ontario, North	" "	200 00
	Peterboro', East	" "	100 00
	Wellington, Centre	" "	100 00
	" South	" "	200 00
	Total		$1,816 67

The following Police Magistrates have been appointed with the salaries and travelling expenses placed opposite to their names, such salaries and travelling expenses being paid wholly from municipal funds, except in the case of Muskoka.

District.	Name.	Date of Appointment.	Amount of Salary.	Amount of Travelling Expenses.
			$. c.	$. c.
Brant	James Grace	May 6, 1887	600 00	150 00
Bruce	R. Vanstone	June 3, "	600 00	300 00
Dufferin	Matthew Stickney Gray	June 1, "	600 00	150 00
Elgin	Wm. E. Leonard	June 1, "	600 00	200 00
Frontenac	NcKim Hiram	June 12, "	500 00	150 00
Huron	R. Williams	May 23, "	600 00	300 00
Halton	W. H. Young	Oct. 18, "	600 00	150 00
Lennox and Addington	James Daley	June 3, "	600 00	200 00
Leeds and Grenville	James Judd	May 6, "	600 00	300 00
Lanark	Duncan Keppen	May 6, "	600 00	150 00
Middlesex	James Noble	May 23, "	600 00	300 00
Muskoka	W. H. Spencer	May 6, "	600 00	200 00
Norfolk	Charles M. Brown	April 29, "	600 00	200 00
Northumberland and Dnrham	Richard Clark	Sept. 3, "	600 00	250 00
Ontario	George Horne	June 1, "	600 00	250 00
Oxford	J. Kelbourne	June 12, "	600 00	and travelling expenses
Peterboro'	James Edinison	June 11, "	600 00	300 00
Renfrew	S. E. Mitchell	June 1, "	600 00	250 00
Simcoe	John Thomas Partridge	June 3, "	600 00	300 00
Stormont, Dundas and Glengarry	James Shaver	Sept. 8, "	600 00	250 00
Victoria	James Deacon	April 29, "	600 00	200 00
Total			$12500 00	$4550 00

BINDING SECT. AUG 2 3 1967